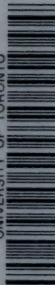


THREE YEARS OF ARCTIC SERVICE




A·W·GREELY

UNIVERSITY OF TORONTO



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Wm. Greeley

THREE YEARS OF ARCTIC SERVICE

AN ACCOUNT OF THE

LADY FRANKLIN BAY EXPEDITION

OF 1881-84

AND THE ATTAINMENT OF THE

FARTHEST NORTH

BY

ADOLPHUS W. GREELY

LIEUTENANT U. S. ARMY, COMMANDING THE EXPEDITION


WITH OVER ONE HUNDRED ILLUSTRATIONS MADE FROM PHOTOGRAPHS
TAKEN BY THE PARTY, AND WITH THE OFFICIAL
MAPS AND CHARTS

NEW YORK

CHARLES SCRIBNER'S SONS

1894

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TROW DIRECTORY
PRINTING AND BOOKBINDING COMPANY
NEW YORK

To the

LADY FRANKLIN BAY EXPEDITION

THESE VOLUMES ARE DEDICATED:

TO ITS DEAD WHO SUFFERED MUCH—TO

ITS LIVING WHO SUFFERED MORE.

THEIR ENERGY ACCOMPLISHED THE FARTHEST NORTH:

THEIR FIDELITY WROUGHT OUT SUCCESS;

THEIR COURAGE FACED DEATH UNDAUNTEDLY;

THEIR LOYALTY AND DISCIPLINE IN ALL THE

DARK DAYS ENSURED THAT THIS RECORD

OF THEIR SERVICES SHOULD BE GIVEN TO

THE WORLD

PREFACE TO NEW EDITION.

It is ten years to-day since the survivors of the Lady Franklin Expedition were rescued, but interest in the story of their achievements and sufferings has not materially abated. The amount and character of their field and scientific work have received international recognition. Not only did the party attain the "highest North" of all time, which yet remains unsurpassed, but it determined the insularity of Greenland and discovered and traced scores of miles to the northward, the unknown shores of a new land. In physical science its work stands unique, as the only complete set of astronomical, magnetic, meteorological, pendulum, and tidal observations ever made in a very high latitude. These observations have enabled scientists to determine that the diurnal inequality of the tidal-wave conforms at Lady Franklin Bay to the sidereal day and to calculate for the Smith Sound region the secular variation of magnetic declination for past years, while, in the words of an acknowledged authority, by a series of pendulum "observations, . . . far the best that have ever been made within the arctic circle, . . . [its] determination of gravity has been signally successful."

Apart from these substantial contributions to the

sum of human knowledge, there remains the story of endurance against adverse fortune, which an English arctic explorer has said reads like a fairy-tale, and which, in tributes to the dead, has been commended in terms that cannot be here repeated.

Two accounts of the proceedings of the expedition have appeared from my pen: one, the official report, in two very large quarto volumes, now out of print and rarely accessible; the other, an elaborate publication, in which were embodied not only the general story of the expedition, but also the official orders and instructions, details, and *résumés* of the scientific work, with extensive appendices bearing on botanical, ethnological, meteorological, and other scientific subjects.

In preparing a popular edition in English, the same plan and scope have been followed as were pursued in the French and German editions. All the photographic reproductions have been retained, and only such portions of the text have been omitted as bear on scientific and historical matters, unessential to a full understanding of the expedition.

The narrative is unbroken, the journals of the sledging parties are complete, the hazardous boat-journey and ice-drift are described in full, and the story of the sufferings and endurance of the party, abandoned to a shelterless winter on the barren crags of Sabine, remains in its integrity.

A. W. GREELY.

WASHINGTON, D.C., June 21, 1894.

PREFACE.

THESE volumes appear in response to the demands of the general public for a popular account of the Lady Franklin Bay Expedition; and in their preparation I have spared neither health nor strength since the rendition of my official narrative to the War Department has left me free. The Secretary of War kindly granted me authority to incorporate in this work such official journals, maps, etc.; as I might desire.

This narrative, however, is based on my diary, though I have drawn freely, always with credit, from the official field reports, and also from the very complete journals of Lieutenant Lockwood and Sergeant Brainard, the only regular diaries, with my own, kept during the retreat and our subsequent life at Camp Clay.

Fearing exaggeration, I have occasionally modified statements and opinions entered in my original journal, believing it better to underrate than enlarge the wonders of the Arctic regions, which have been too often questioned.

I have profited largely by the acute criticism of my

wife, who, stimulated into intense activity by the critical situation of the expedition during its last year of service, acquired a more than cursory knowledge of Arctic work. During the doubtful time she noted with keen perception the vital importance of the rejected bounty scheme and urged it through sympathizing friends to final passage.

The engravings are faithful reproductions of an unequalled series of Arctic views, the work of Sergeant Rice, the photographer, except field sketches—always noted—and original drawings made under my supervision, for the correctness of which I personally vouch.

No pen could ever convey to the world an adequate idea of the abject misery and extreme wretchedness to which we were reduced at Cape Sabine. Insufficiently clothed, for months without drinking water, destitute of warmth, our sleeping-bags frozen to the ground, our walls, roof, and floor covered with frost and ice, subsisting on *one-fifth* of an Arctic ration—almost without clothing, light, heat, or food, yet we were never without courage, faith, and hope. The extraordinary spirit of loyalty, patience, charity, and self-denial,—daily and almost universally exhibited by our famished and nearly maddened party,—must be read between the lines in the account of our daily life penned under such desperate and untoward circumstances. Such words, written at such a time, I have not the heart to enlarge on.

The tragic experiences of the party excited such a

public interest, further intensified by exaggerated and unfounded statements on many points, that I have felt obliged to touch briefly upon all disagreeable questions. In so doing I have adhered to the stern facts, while I have modified the acerbity of my judgments, remembering always that I speak of the dead, and being able in comfort and plenty to judge more leniently than when slowly perishing from cold, disease, and starvation.

For a quarter of a century a public servant, in war and in peace, my faults are known. Cruelty and injustice, however, are foreign to my nature ; and I rejoice that during the nine months I commanded a party of suffering, starving, and dying comrades, I never treated any man other than he justly merited.

In this spirit I submit these unvarnished records of Arctic service to the public.

A. W. GREELY.

WASHINGTON, January 5, 1886.

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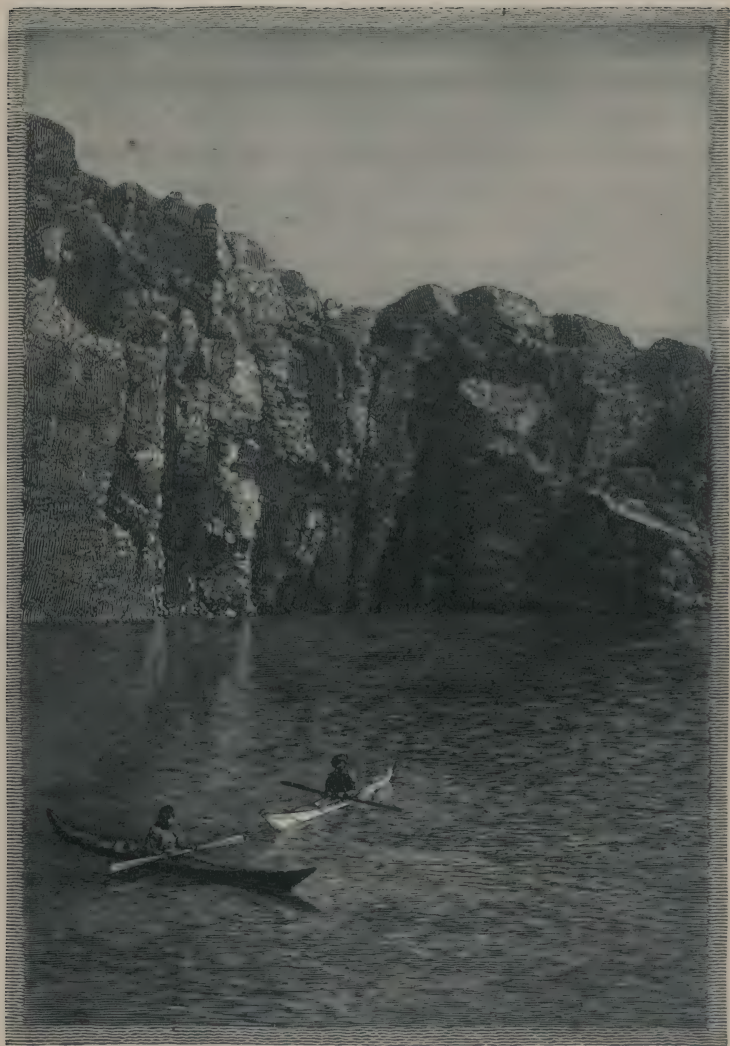
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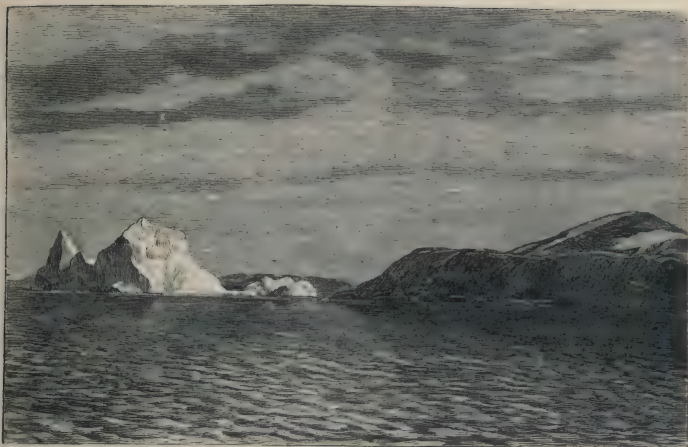
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ESKIMO KAYAKERS OFF THE COAST OF DISCO.

(From a photograph.)



Sanderson's Hope.
[*The farthest of John Davis, 1587.*]

CHAPTER I.

THE LADY FRANKLIN BAY EXPEDITION.

THE American Polar Expedition of 1881 was for the purpose of establishing on the shores of Lady Franklin Bay one of the circumpolar stations recommended by the International Polar Conference of Berne. The initiation of this scientific scheme was due to the exertions of Charles Weyprecht, of the Austrian Navy, whose extended experiences in two Arctic expeditions had impressed him with their scientific importance.

Weyprecht's second voyage, in command of the *Tegetthoff*, 1872-1874, had resulted in the discovery of a new polar archipelago, Franz Josef Land, to the north of Nova Zembla, but his ship, beset inextricably in a heavy ice-pack, was necessarily abandoned by his party, who retreated by sledge and boat to Nova Zembla.

Undismayed by his hardships, but profiting by his experiences, Weyprecht, at the meeting of the German Scientific and

Medical Association, at Gratz, in September, 1875, presented a plea for systematic polar exploration and research. He proposed that scientific investigations, heretofore subordinated to geographical discovery, be now made the primary object.

Insisting on the great importance of Arctic exploration to a better knowledge of the laws of nature, he pointed out that minute topography was comparatively unimportant, and that geographical discoveries were of marked value only when they



Godthaab, Greenland. International Station, 1882-83.
[Farthest point reached by Davis, 1585.]

extended the fields for scientific inquiry. Observation stations, he said, should be chosen particularly with reference to the subject to be investigated, and the series of observations should be continuous and unbroken.

A commission, comprising some of Germany's most eminent scientific men, was appointed by Prince Bismarck to consider the question. The commission strongly commended the plan to the Bundesrath and to all interested nations. It expressed its convictions as to the great value of the work, and its opinion

that the united action of several countries was essential to a complete solution of the problems involved.

In May, 1877, Count Wilczek and Weyprecht drew up a plan for the work, but the Turko-Russian war prevented the meeting of the International Meteorological Congress to which it was to be presented. The Congress finally met at Rome, April 22, 1879.

The Conference was of the "opinion that these observations will be of the highest importance in developing meteorology and in extending our knowledge of terrestrial magnetism." It recommended general participation, and called an International Polar Conference, which met at Hamburg, October 1, 1879. Eight countries sent delegates and three sent communications favoring the project. Dr. Neumayer was elected President. Twelve stations (four in the Antarctic regions) were agreed on, one of which was to be in the Archipelago of North America. Rules for obligatory and optional observations were formulated. An agreement was made that no nation should be bound until eight stations should be guaranteed.

The second Conference met at Berne, August 7, 1880, and Professor Wild was elected President, *vice* Neumayer resigned. Nine nations, Austria-Hungary, Denmark, France, Germany, Italy, Netherlands, Norway, Russia, and Sweden, sent delegates. The Conference adhered to its previous decision regarding the general principles and details of the plan. Sufficient progress had been made to justify the expectation of enough nations participating to ultimately make the scheme successful. Its execution, however, was deferred until 1882-83.

In the meantime, Captain Howgate, United States Army, had especially interested himself in Arctic matters, and in 1877 sent to Cumberland Gulf the schooner Florence with the view of collecting dogs, skin-clothing, etc., for a projected colony at

Lady Franklin Bay. Failing in his direct plan for a polar colony, Captain Howgate succeeded in having Lady Franklin Bay designated as the point in the Archipelago of North America which was to be occupied by the United States Signal Service as a polar station.

The importance of Lady Franklin Bay as a station was undeniable, as comparable observations in meteorology and magnetism would thus be obtained. Captain Howgate's indefatigable exertions finally resulted in the Act of Congress, approved May 1, 1880, which authorized the establishment of a temporary station at Lady Franklin Bay for scientific observation, etc., and provided for the acceptance and fitting out for such work of the steamship *Gulnare*, which he had purchased.

Lieutenants Greely, Doane, and Lowe, United States Army, were detailed for duty in this service, and Dr. Octave Pavy employed as surgeon. The expedition was to carry out the programme outlined by the Hamburg Polar Conference. The refusal of the Navy Department to accept the *Gulnare* for the work caused Lieutenant Greely to decline the command of the expedition, but the others proceeded to Disco, whence the *Gulnare* returned disabled leaving Dr. Pavy in Greenland.

Dr. Wild, President of the International Polar Commission, in September, 1880, informed the Chief Signal Officer that two stations were yet lacking—Point Barrow and "some point in the Archipelago of North America." The Sundry Civil Bill of March 3, 1881, appropriated \$25,000 for the station at Lady Franklin Bay, already authorized by Congress. General W. B. Hazen had in the meantime become Chief Signal Officer, and, impressed with the scientific importance of the work and the propriety of the United States doing its part, not only took a personal and active interest in the international station of Lady

Franklin Bay, but also established independently the second station, in a much lower latitude, at Point Barrow.

Eventually fourteen stations were established as follows:

Government.	Station.	Latitude.	Longitude.	Chief.
Austria—Hungary.	Jan Mayen	70° 59' N.	8° 28' W.	Lieut. Emil von Wohlgemuth.
Denmark	Godthaab	64° 11' N.	51° 40' W.	Asst. A. F. W. Paulsen.
Finland	Sodankyla	67° 24' N.	26° 36' E.	Asst. E. Biese.
France	Orange Bay	55° 31' S.	70° 21' W.	Lieut. Courcelle-Seneuil.
Germany	Cape Horn	66° 36' N.	67° 14' W.	Dr. W. Giese.
	Kingawa Fiord			
Germany	Cumberland Sound	53° 31' S.	36° 5' W.	Dr. C. Schrader.
	Royal Bay			
Germany	S. Georgian Islands }			
Great Britain and				
Canada	Ft. Rae	62° 39' N.	115° 44' W.	Capt. H. P. Dawson, R. A.
Holland	Dicksonhaven	73° 30' N.	81° E.	Dr. M. Snellen.
Norway	Bossekop	69° 56' N.	23° E.	Asst. A. S. Steen.
Russia	Sagastyr Id., Lena R. }	73° 23' N.	126° 35' E.	Lieut. Jürgens.
Russia	Nova Zembla	*72° 30' N.	53° E.	Lieut. Andrejew.
	Little Karmakuli			
Sweden	Spitzbergen	78° 28' N.	15° 45' E.	Candidate N. Ekholm.
United States	Point Barrow	71° 18' N.	156° 24' W.	Lieut. P. H. Ray, 8th Inf.
United States	Lady Franklin Bay	81° 44' N.	64° 45' W.	Lieut. A. W. Greely, 5th Cav.

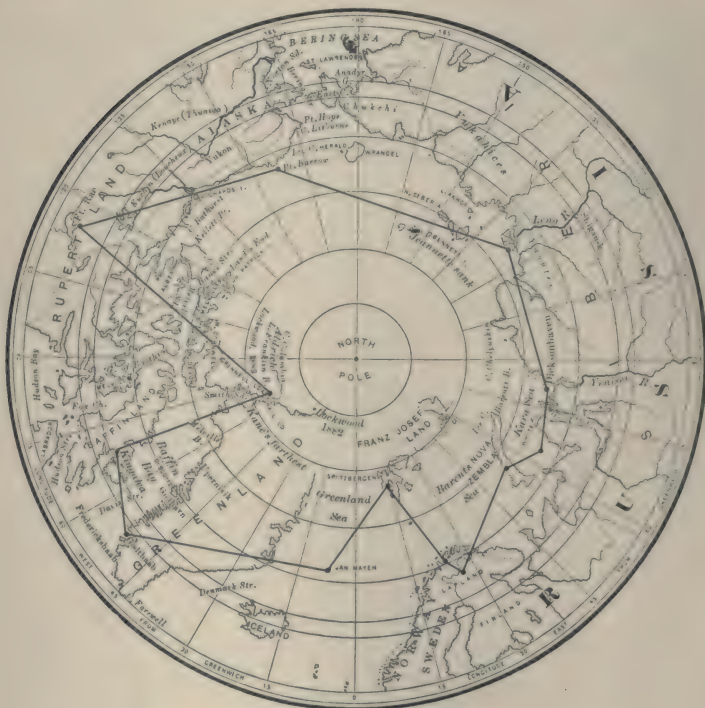
* Estimated.

To these stations should be added the Danish exploring steamer *Dijmphna*, Lieutenant A. P. Hovgaard, which, beset by the pack, wintered in the Kara Sea about 71° N., 64° E.

In the establishment and relief of these stations some seven hundred men incurred dangers incident to all Arctic service, but such has been the improvement in Arctic equipment that save in the case of the *Lady Franklin Bay* expedition no man perished.

The scientific work of each expedition was to a greater or lesser extent successful. Weyprecht died, but the work he planned was carried on and is finished. Progress in the development of physical sciences and the discovery of new laws largely proceeds from tentative efforts. The scientific work of these stations must be justly measured by the final result. Geodesy, meteorology, and magnetism may, or may not, profit as fully as sanguine advocates anticipated. Be that as it may the work

of the International Polar Commission will live in history as a great one, if only as an epoch in modern civilization marked by the union of eleven great nations in planning and executing for strictly scientific purposes so extensive and dangerous a work.



Arctic Regions, Showing Location of Circumpolar Stations, 1881-83.

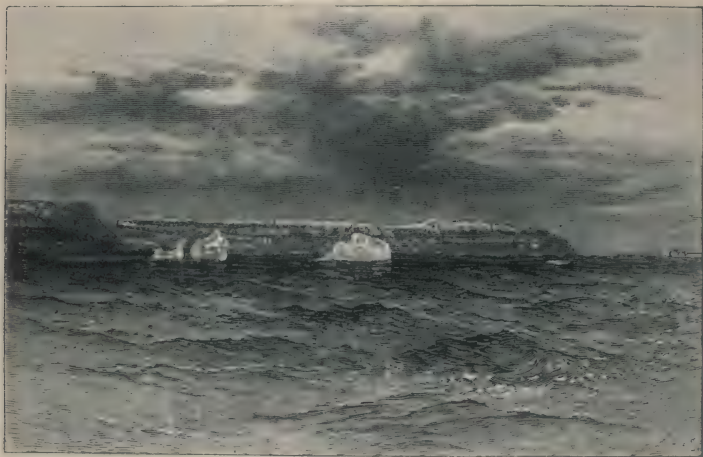
The station to be occupied by the Lady Franklin Bay Expedition was on the then most northerly known land of the world, the point selected being on Grinnell Land, within 496 miles of the North Pole, in $81^{\circ} 44'$ N. latitude, $64^{\circ} 45'$ W. longitude. The water channels to be passed in reaching this point

are known among Arctic explorers as the "American route," owing to the extensive explorations made therein by Kane, Hayes, and Hall. Its first Arctic waters are those of Davis Strait, between Greenland and North America, where in three venturesome voyages, 1585-1587, John Davis, one of England's most distinguished seamen, rediscovered Greenland, reaching Godthaab in 1585, and in 1587 the noble headland of Sander-son's Hope on the west coast of Greenland, $72^{\circ} 41'$ N. latitude. Half a century later another able seaman and great discoverer, William Baffin, reached, on July 5, 1616, his farthest point, within sight of Cape Alexander. His latitude, about $77^{\circ} 45'$ N., remained unequalled in that sea for 236 years. Baffin, in quaint language, says he was forced by ice "to stand backe some eight leagues to an iland we called Hakluits Ile—it lyeth betweene two great Sounds, the one Whale Sound, and the other Sir Thomas Smith's Sound; this last runneth to the north of 78° , and is admirable in one respect, because in it is the greatest variation of the compasse of any part of the world known; for by divers good observations I found it to be above five points, or 56 degrees varied to the westward."

For two centuries the waters first navigated by Baffin remained untroubled by any keel, and the very credit of his discoveries passed away. In 1818 Barrington, in "Possibility of Approaching the North Pole Asserted," put forth a chart with the legend, "Baffin's Bay, according to the relation of W. Baffin, in 1616, but not now believed." Sir John Barrow, in his "Chronological History of the Voyages into the Arctic Regions," 1818, omitted Baffin Bay from his circumpolar chart.

In 1818 Captain John Ross entered Baffin Bay and discovered the natives of the Cape York region, to whom he gave the name of Arctic Highlanders, but he failed to reach a more northerly point than Baffin, and erroneously considered Smith

Sound of that explorer as a closed bay. In 1852 Captain, now Admiral Inglefield, R.N., searching for Sir John Franklin, passed Cape Alexander and the Crystal Palace Cliffs to the neighborhood of Littleton Island, reaching August 27th latitude $78^{\circ} 21' N.$, at the very entrance of the great polar ba-



Crystal Palace Cliffs from Littleton Island, with Cape Alexander at the right.

[*Discovered by Admiral Inglefield, R.N., 1852.*]

sin, whose portal was first passed by a gallant and enthusiastic American, Elisha Kent Kane. In his voyage of 1853-1855 Kane succeeded in extending the limits of Kane Sea northward to Cape Constitution, about $80^{\circ} 35' N.$ on the east, and to Cape Hayes, about $79^{\circ} 43' N.$ on the west. Kane's energetic surgeon, Dr. I. I. Hayes, in 1860-61 wintered in Foulk Fiord, $78^{\circ} 18' N.$, $73^{\circ} W.$, and succeeded in reaching, on the west shore of Kane Sea, a point unknown owing to conflicting astronomical observations, probably at Cape Joseph Good. Hayes was the first known civilized man to tread the new lands of Ellesmere and Grinnell.

The most extensive discoveries by this route, however, were those by Charles F. Hall in the American ship *Polaris* 1871-1873, during which he extended both Greenland and Grinnell Land northward over a degree and a half of latitude, charted Kennedy Channel, Hall's Basin, and Robeson's Channel, discovered the extensive frozen sea to the northward, and



Site of Polaris House.

[Built at Life Boat Cove by *Polaris* Crew, Winter, 1872-73.]

determined the insularity of Greenland through tidal observations, which showed that the Atlantic tides flowing in two directions around the north and south of Greenland meet at the south end of Kennedy Channel. The death of Hall by apoplexy prevented extended land journeys, but Sergeant Frederick Meyer, Signal Corps, U. S. Army, reached on foot Repulse Harbor, $82^{\circ} 09'$, the highest latitude at that time ever

attained on land. On its return voyage the *Polaris*, beset in a pack, was seriously injured, during a violent storm which separated her crew, near Littleton Island. The *Polaris* was



English Cairn, S. E. Cary Island, 1875.

[*Baflin discovered this island, 1616.*]

beached in Life Boat Cove, near that island, where that portion of the crew wintered 1872-73 in a house built from the wreck. The floe party drifted southward for one hundred and ninety-six days, eighty-three without the sun, and after great privations and numberless dangers, were rescued fifteen hundred miles to the south of Littleton Island, off the coast of Labrador, by the sealer *Tigress*.

In 1875 an English expedition under Captain (now Admiral and Sir) George Nares attempted by this route to reach the North Pole with two vessels, *Alert* and *Discovery*, and 123 officers and men. This expedition on its northward route left a whale-boat and 3,600 rations on the southeast of Carey Island, 240 rations at Payer Harbor, Cape Sabine, and 3,600 more at Cape Hawkes. The *Discovery* wintered in Lady Franklin

Bay, while the Alert, reaching the highest latitude ever attained by any vessel, wintered at Floeberg Beach, $82^{\circ} 35' N.$, $61^{\circ} 32' W.$ Three very extended sledge expeditions were made, very successful in their results although unfortunately involving great physical sufferings and loss of life. One under Aldrich surveyed 220 miles of previously unknown coast, reaching Cape Alfred Ernest, $82^{\circ} 16' N.$, $85^{\circ} 33' W.$, and passing in the journey Cape Columbia, $83^{\circ} 07' N.$, the most northerly point of Grinnell Land and of the then known Polar regions. Beaumont, from the Discovery in Lady Franklin Bay, explored the north coast of Greenland and reached, May 20, 1876, the eastern coast of Sherard Osborn Fiord, $82^{\circ} 20' N.$, $51^{\circ} W.$ Commander, now Admiral, Albert H. Markham, after indescribable exertions, reached on the frozen polar ocean May 12, 1876, $83^{\circ} 20' 26'' N.$, $63^{\circ} 05' W.$, at that time the highest latitude ever attained.

This expedition explored Archer's Fiord, outlined the entire northern coast of Grinnell Land, added nearly a hundred miles to the Greenland coast, pushed an English vessel into the highest known latitude, and planted the Union Jack both on land and sea nearer the Pole than ever before. They brought back an elaborate set of tidal, magnetic, and meteorological observations, which are valuable contributions to the physical sciences. They charted Greenland and Grinnell Land with remarkable exactitude, and depicted the circumstances of their sufferings and experiences in narratives which are notable both for their modesty and accuracy.

My own experiences regarding Arctic service somewhat resemble those of Payer. He relates: "In the year 1868, while employed on the survey of the Orteler Alps, a newspaper with an account of Koldewey's first expedition one day found its way into my tent on the mountain-side. In the even-

ing I held forth on the North Pole to the herdsmen and *Jägers* of my party as we sat around the fire, no one filled with more astonishment than myself that there should be men endowed with such capacity to endure cold and darkness. No presentiment had I then that the very next year I should myself have joined an expedition to the North Pole; and as little



Upernivik.

[The most northerly civilized settlement in the whole world.]

could Haller, one of my *Jägers* at that time, foresee that he would accompany me on my third expedition."

Surprised, as all the world, at their return, I read one day in London that the Arctic squadron had reached the Irish coast, and with all England I was absorbed in the story they had to tell. It had then for me a deep, although impersonal, interest, but never in my wildest fancies did I picture myself as

one of the *next* expedition which should sail northward between the "Pillars of Hercules" into the "Unknown Regions."

The expedition, now destined to follow after these world-renowned explorers, was organized under an order of the War Department, March 11, 1881, as follows: "By direction of the President, First Lieutenant A. W. Greely, Fifth Cavalry, acting signal officer, is hereby assigned to the command of the expeditionary force now organizing under the provisions of the acts



Greenland Coast.

[View near Godhavn.]

of Congress approved May 1, 1880, and March 3, 1881, to establish a station north of the eighty-first degree of north latitude, at or near Lady Franklin Bay, for the purpose of scientific observation, etc., as set forth in said acts."

The subordinate force as finally organized consisted of the following officers and enlisted men, all volunteers from the army: Lieutenant Frederick F. Kislingbury; Lieutenant James B. Lockwood; Sergeants Edward Israel, Astronomer, George



MEMBERS OF LADY FRANKLIN BAY EXPEDITION, 1881-4. (From a photograph by Rice.)

Whaler,	Ellis,	Cross,	Frederick,	Lynn,	Bislerbick,	Henry,	Long,	Ralston,	Salor,	Dr. Pavy,	Gardner,	Ellison,
Cornell,	Brainard,	Lt. Kialingbury,	Lt. Greely,	Lt. Lockwood,	Israel,	Jewell,	Rice,					

W. Rice, Photographer, Winfield S. Jewell, Meteorologist, David C. Ralston, Meteorologist, Hampden S. Gardiner, Meteorologist, William H. Cross, Engineer, David L. Brainard, Orderly Sergeant, and David Linn; Acting Hospital Steward Henry Bierderbick; Corporals Nicholas Salor and Joseph Ellison; Privates Jacob Bender (true name George C. Leyerzopf), Maurice Connell, William A. Ellis, Julius Frederick, Charles B. Henry (true name Charles Henry Buck), Francis Long, Roderick R. Schneider, and William Whisler. Doctor Octave Pavy was contracted with as an Acting Assistant Surgeon, and two Eskimo, Thorlip Frederik, Christiansen and Jens Edwards were employed as dog-drivers.

As to the members of the expedition, it is hardly necessary to remark that all were highly recommended, passed a strict medical examination, and were volunteers. Lieutenant Kislingbury, in a service of over fifteen years, had a fine reputation for field duty. Lieutenant Lockwood had served eight years, almost always on the frontier, and was highly recommended as an officer of sterling merit and varied attainments.

Edward Israel and George W. Rice, in order to accompany the expedition, cheerfully accepted service as enlisted men. The former, a graduate of Ann Arbor University, went in his chosen profession as astronomer, while the latter, a professional photographer, hoped to add to his reputation in that art by service with the expedition. Sergeants Jewell and Ralston had served long and faithfully as meteorological observers; while Gardiner, though of younger service, was most promising. Long and hazardous duty on the Western frontier had inured the greater part of the men to dangers, hardships, and exposure, and developed in them that quality of helpfulness so essential in Arctic service.

The organization and equipment of the Lady Franklin Bay

Expedition were accomplished under very great disadvantages, arising not only from inadequate means, but from the avowed hostility to the work of the Cabinet chief, under whose charge it necessarily was. No friendly board of Arctic experts, with lavish funds at its command, assisted by its counsel and advice,



Arctic Belles.

but the preparation in this case devolved entirely on the commanding officer of the expedition. The detailed requisitions for food, clothing, and other supplies were prepared in seventy-two hours, and under stress of knowledge that the question of sending the expedition depended very largely on the character and quantity of supplies asked for. Although assigned to com-

mand March 11th, the whole matter was later held in abeyance by Mr. Lincoln, then Secretary of War, and until April 1st, despite the personal efforts of Senator Conger and the persistent labors of General Hazen, it was undecided if the expedition should go. The formal approval (General Order 35, War Department) was not issued until April 12th, barely two months prior to the departure of the main party, thus crowding an amount of labor and responsibility on the commander that taxed unreasonably his mental and physical powers.

The plan contemplated the transportation of the expedition in a chartered vessel from St. John's, Newfoundland, to Lady Franklin Bay, where the party was to establish their quarters, the ship returning. A steamer was to visit the station annually with supplies and recruits. Several designated vessels were carefully inspected under directions from the Secretary of the Navy, and from those reported to be fit for the service the steamer *Proteus* was selected. She was a new (7 years old) barkentine-rigged steamer of oak, with two compound engines; 110 horsepower; 467 tons register; had an iron armed prow, and was sheathed with ironwood from above the water-line to below the turn of the bilge. She had been built for the sealing business under personal supervision of her owners, and conformed in all respects to the most approved methods of construction for use in heavy Arctic ice. Her screw was self-lifting, she had spare rudder and propeller, and was in every respect suitable for the projected work. Her master, Richard Pike, had for many years been engaged in the dangerous seal-fishery of the Labrador ice, and was one of the most experienced captains and ice-navigators of Newfoundland. His crew were selected men from the hardy fishermen of that island. The charter of this vessel consumed over three-fourths of the appropriation, leaving less than six thousand dollars for the special outfit of the party.

This small sum was economically spent for our supply of coal, scientific instruments, boats, dogs, dog-food, special woollen and fur clothing, pemmican, lime-juice, spirits, special articles of diet, natural history supplies, table and household equipage, etc. Nothing was purchased except after most careful consideration as to its necessity and cost. In consequence many very desirable articles were omitted, and in all cases the supply reduced to a minimum. The War Department declined to facilitate or make special the requisition for the appropriation, which was not available, in any event, until July 1st. In consequence, rather than abandon the undertaking, it became necessary at the last moment to guarantee many bills for special articles purchased. For friendly services in this as in other important respects, both the expedition and myself were under special obligations to Major Charles Appleby, of New York.

The various bureaus of the War Department furnished excellent arms and ammunition, clothing, and camp equipage (army pattern only), hospital stores, and the usual field supply of medicines. Ample subsistence stores, of superior quality, were furnished on requisition for sale to officers and men.

Lieutenant Kislingbury and two men left New York, May 31st, to supervise the stowing of cargo. On June 14th the main party, under command of Lieutenant James B. Lockwood, sailed from Baltimore for St. John's on the steamer *Nova Scotian*.

Professor Daniel C. Gilman, President of Johns Hopkins University, took a decided interest in this scientific work of international importance. His desire to evidence this in some public manner, in conjunction with other prominent Baltimoreans, was thoroughly appreciated. The early hour of sailing, and the limited time the party could remain in Baltimore, were cogent reasons why his kindly thought assumed no tangible form.

I had hoped to sail from St. John's, Newfoundland, July 1st, but the condition of affairs was such, on my arrival at that point on June 27th, as to render it impossible. Certain essential supplies had not arrived, and the stores on board the *Proteus* were in endless confusion. The Secretary of the Navy had kindly furnished a small steam-launch, but its boiler proved entirely unsuitable for salt water, and had to be replaced at St. John's. Such results necessarily flowed from a policy which rendered it obligatory to perfect in two months and a half the outfitting of a party destined for over two years' separation from the rest of the world. Though succeeding experiences proved that no article really essential to health or success was wanting, yet other results might have easily followed, and certain deficiencies did occur which, in longer time, could have been remedied to our later pleasure and comfort.

On July 4th, with all on board, the *Proteus* dropped to anchor off Queen's wharf, awaiting the final supplies. They came on the 7th, and at noon of that day we passed the majestic cliffs which form the narrows of St. John's, and turned our prow toward Greenland with fine weather, blue sky, and favoring wind.

There was a touch of sadness mingled with our exultation; for, while we sped on to the icy north, not only were loving hearts left behind us in the sunny south, but our great nation with bated breath was watching over its dying chief.

CHAPTER II.

THE VOYAGE TO UPERNIVIK.—July, 1881.

BONAVISTA with its shining light was passed the evening of the 7th, from which point we hoped—and not in vain—to be reported. A few scattered icebergs were seen between Funk Island and the straits of Belle Isle, the lingering remnants of the enormous ice-fields which cover the Newfoundland waters during the spring months.

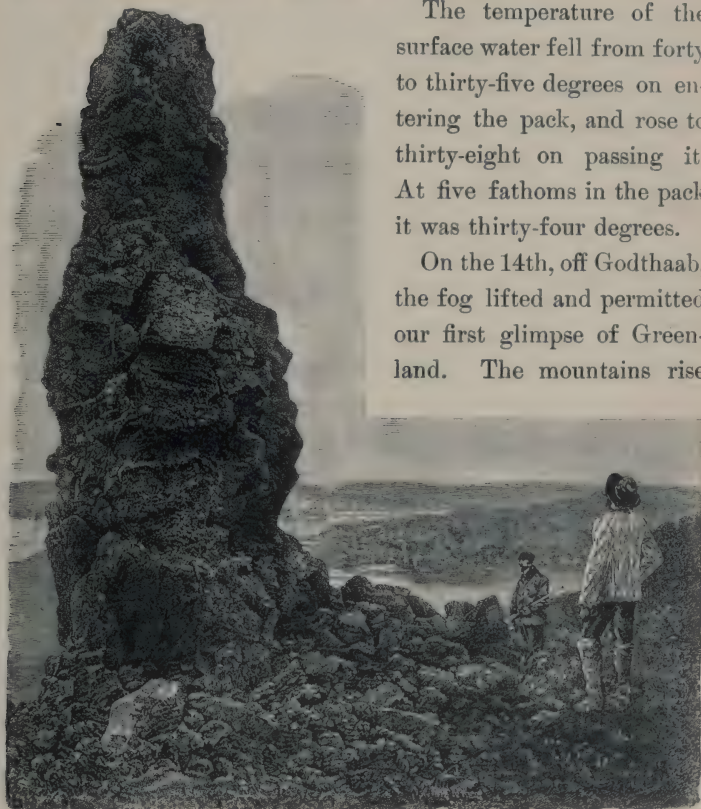
Northwesterly gales and thick weather delayed us, but on the 13th we were in Davis Strait off Frederickshaab, where the first ice was encountered. The pack was a loose one and consisted of two streams of ice from ten to thirty miles wide, which in no way impeded the ship's progress. These floes were offshoots of the great Spitzbergen ice-stream which, drifting down the coast of East Greenland, are set along the west shore by the prevailing northerly current. The greater part of the ice ranged from three to five feet above the water, and almost without exception each piece was deeply grooved at the water's edge, evidently by the action of the waves. Above and below the surface of the sea projected long tongue-like edges. The novel and fascinating scene engaged the attention of all.

The advancing and receding waves along the tongues of ice continually changed their aspect, and gave forth colors which resolved themselves into indescribable hues of great beauty. The most delicate tints of blue mingled quickly and indistin-

guishably into those of rare light green, to be succeeded later as the water receded from the floe's side, by shades of bluish white. Occasional floes were twelve or fifteen feet high and in these at times the level surfaces gave way to pinnacles or hummocks.

The temperature of the surface water fell from forty to thirty-five degrees on entering the pack, and rose to thirty-eight on passing it. At five fathoms in the pack it was thirty-four degrees.

On the 14th, off Godthaab, the fog lifted and permitted our first glimpse of Greenland. The mountains rise



Natural Monument near Godhavn. (From a Photograph.)

some three thousand feet, displaying their glacial garb as a fitting border to the desolate coast in the foreground.

The northerly gale broke sufficiently on the 14th to afford glimpses of the sun, and our noonday observation—the first of

the voyage—placed us within the Arctic circle. The bleak highlands of Disco were hidden by an Arctic fog, and only disclosed themselves, after hours of tedious waiting on the evening of the 15th, when we found ourselves but a few miles from Godhavn. The south coast of Disco Island rises precipitously some twenty-five hundred feet out of the sea, and in some seventy miles it breaks only at Godhavn, to form a secure and land-locked harbor. The entrance is so hidden, however, that in making it one seems to be beaching the vessel, until an abrupt turn leads to the tranquil cove in front of the very settlement.

As we entered, a small gun belched forth a salute, and the Danish flag was displayed from the station's flagstaff. Our vessel was hardly anchored when a kindly gentleman, evidently of Scandinavian origin, boarded it, and in good English bade us welcome to Disco. It was Herr Krarup Smith, the Royal Inspector of North Greenland, an official of unvarying courtesy, whose helpful kindness and advice was always at the command of whaler or explorer. His death in May, 1882, created a void in Northern Greenland which it will be difficult to fill.

Inspector Smith was about leaving for his annual tour of inspection to Upernivik, on the Danish brig which lay in the harbor. He delayed his departure a day that he might extend to the expedition all possible assistance.

The usual visits of ceremony were duly made, and later the officers of the party dined with Mrs. Smith. The dinner was a surprise to us all, as we expected but little variety in that part of the globe. A tiny bouquet of cultivated flowers for each, first greeted our vision. The principal dishes were fresh Greenland salmon of delicate flavor, larded eider-ducks, and tender Arctic ptarmigan; all served with excellent wines.

Regarding vegetables, it should be said that, except radishes, lettuce, etc., they are imported canned, as they will not grow at

Godhavn. There was no fresh meat there except a little which we were able to spare. Reindeer (which formerly roamed over Disco alone of the Greenland islands) is the favorite meat with Europeans, though many relish seal meat. The latter, though tender and juicy, has a slightly sweetish taste, which is as unpalatable to some as its coarse, dark meat is displeasing to the eye. It can be recommended, however, as very nutritious.

At Godhavn it is a case of the mountain and the sea, for as you turn your back to Disco Bay the cliffs spring over two thousand feet out of the very water. The upper half, a dark beetling precipice, impresses one equally by its grandeur and desolation. The lower half is clothed more or less with vegetation, and at one point a break in the cliff leaves a sloping valley, through which glides a sparkling brook, which from above plunges wildly down its bed of rugged rock. This brook hardly seems an Arctic one, as its banks and borders are covered with a vegetation which would be luxuriant even in lower latitudes. The valley is called the "heath-field," and the visitor well believes the statement that it is the best botanical spot of Greenland, and that over forty varieties of plants can there be gathered.

The surroundings of Godhavn are striking and impressive. The settlement itself is situated on a small syenite island, which is sparsely covered with soil and vegetation. Its highest point is of scarcely a hundred feet elevation, but so numerous were the icebergs on that July day, that from it more than a hundred could be counted at once.

These huge masses of castellated ice broke with their snowy whiteness the monotony of the sea, and as they drifted past, drew after them unceasingly our thoughts and attention. In general, these white-winged ships were silent messengers of peace, but in entering the harbor our gentle swell struck lazily



GENERAL VIEW OF GODHAVN, GREENLAND, FROM ADJACENT CLIFFS.

(From a photograph.)

and softly a beautiful berg of lofty arches, slender pinnacles, and stately colonnades, down the sides of which miniature torrents poured. It needed but this slight impulse to destroy its equilibrium, and in an instant it burst into countless fragments which whitened the sea with foam, and rolled huge billows in all directions. The thundering report startled us all, and the resistless force shown by this mountain of ice inspired the least impressive with feelings of awe.

The external aspects of the colony of Godhavn represent well the principal trading stations of Greenland. The few dwelling-houses for the Danish officials are commonly wooden structures with thick walls of rough hewn logs, which insure thorough dryness and sufficient warmth. The dark tarred walls are relieved by white or red window-casings, and generally the roof has a reddish tinge quite in consonance with the predominating color of the adjacent rock-masses. It is perhaps needless to say that the interiors of these houses are Danish homes, and that in some of them one would not know, save from the trim, neatly-dressed Eskimo servants, that it was Greenland and not Denmark. Several of the latest books lay on the table at Inspector Smith's, and we were favored with piano accompaniments for many songs, from *The Star Spangled Banner* to Denmark's national anthem. A neat church with spire and bell, the indispensable trade storehouses, with workshops and oil manufactory, conclude the list of Government buildings.

The Eskimo houses are, as a rule, very poor, generally stone and turf structures lined with wood, and provided with the usual wooden, raised platform, serving as a bench by day and for a bed at night. The better class of houses replace the flat roof of dirt and turf by a sloping one of wood, and, besides adding a wooden floor, substitute glass for the old membranous panes from the intestines of the seal.

One rarely can stand erect in a house, and the odors peculiar to the universal Eskimo lamp, united to others, are hardly less trying within, than are the strong-smelling heaps of refuse without, the doors. A cursory view of their interiors was enough for me, and it seems strange that the enforced conditions, under which the inmates of these densely-crowded huts pass the long Arctic winter, do not cause greater ravages by disease.

A very short visit to an Eskimo dance, which was given in honor of our arrival, was sufficient to convince me that the natives understand how to enjoy such gatherings, but did not awaken any inclination to participate therein, though others of the expedition thought otherwise. In Greenland as elsewhere, *chacun à son goût*.

On landing you are at once impressed with the number and character of the dogs. The dog is an important animal in Northern Greenland, and he seems to know his vantage. He looks on every stranger as an enemy, who must be watched and harassed. They are annoying only on their own domain, and are experts in those false attacks which are trying to one's temper and dignity.

It is amusing, when not personally interested, to note how suddenly a snarling, yelling pack, snapping at one's heels, will turn and flee when they near the ground of some other king. He is a rare dog, indeed, who dares travel alone through the entire village of Godhavn. A stick or stone generally quiets a pack, but occasionally, when very harshly treated, and when long starved they are dangerous to children, and even, though very rarely, to men.

Our team purchased at Godhavn were stout, surly animals of apparently incurable viciousness, which, as we shall see later, completely vanished under the benign influences of kind treatment and good food.

Twelve dogs with a supply of dog-food were purchased, and the house and pemmican, stored there by the unfortunate Howgate expedition of 1880, were taken on board.

On July 20th Dr. Octave Pavy arrived from Ritenbenk, where he had passed the preceding year as naturalist of the Howgate expedition. He was contracted with as an acting assistant surgeon of the army for duty with the expedition, and took the oath of service that day.

The last hours at Godhavn were given to our mail, as two days later a Danish brig was to sail from Egedesminde, which should convey to our friends by the end of August full news of our safe arrival in Greenland. A few hours' steaming on the morning of July 21st, took us along the bold, high coast of Disco Island to the entrance of Waigat Strait. Along this coast for fifty miles to the eastward no shelter exists for vessels, and for over five miles from Godhavn, the most active mountaineer would search in vain for a foothold to scale its precipitous cliffs.

Our passage was a charming one with frowning barren crags to our left, and to our right the smooth blue sea, dotted with countless bergs of endless variety, bright and beautiful under Arctic sunshine. But "by and by a cloud took all away," for a dense Arctic fog shut quickly down, and made it difficult for our sharp-eyed Innuít pilot to guide the *Proteus* safely to anchorage in the narrow deep fiord which separates Ritenbenk from Arveprins Island.

The governor bore a name well known in connection with Greenland, Mörch. Half Dane, half Eskimo, a man of refinement and sentiment, he had been educated in the mother country, and had come to do service in his native clime. He made us at home in Ritenbenk, and greeted us with genuine Scandinavian hospitality. The same old Danish brig, *Tialfe*, which

Hayes found at Upernivik in 1860, was in the harbor, and we dined with the governor and her officers that evening. At the end of the meal the old Scandinavian custom of grace, by universal handshaking and the salutation, "Much good may it do you," first fell under my notice.

A number of dogs, with additional food and other supplies, were obtained at Ritenbenk. The new-comers were not at all welcomed by the old dogs, and a series of battles commenced which never ended to the very day of our retreat.

Mr. Henry Clay joined the expedition at Ritenbenk, as a military employé at a nominal salary. The grandson of Henry Clay the great commoner, a cultivated, refined gentleman, and an ardent sportsman, he had become thoroughly imbued with a longing for Arctic experiences. He had joined the Howgate expedition of 1880, and also obtained authority to accompany the present one, and, to fit himself for some part of the work, he had spent the preceding year with Dr. Pavy in Greenland.

While stores were being purchased, dogs brought on board, and accounts adjusted, and as the fog still held, I sent Lieutenant Lockwood with a boat's crew to the loomery on Arveprins Island for birds. They were only moderately successful, owing to the height of the lower ledges above the sea, and brought back but sixty-five Bruennich's guillemots (*Alca arra*).

If you go to Ritenbenk, you must see the garden, the most famous in Northern Greenland. It is a small plot, scarcely fifty feet by forty, surrounded by a substantial fence to keep out the ubiquitous dog, and on one side has a miniature garden-house with sashed windows, where the governor sits and enjoys the growing vegetables, which comprise lettuce, onions, radishes, parsley, and turnips. The soil was in large part originally brought from Denmark, and has been supplemented by earth from old Greenland houses, and so is rich and strong. This

bright spot of green contrasted most delightfully with the bleak, brownish syenite of the otherwise barren island.

It gave me much pleasure, sitting awhile in the summer-house, to listen to the good governor and enjoy the grand scenery, while I heard, in answer to an idle question, that an old Eskimo over the mountain toward Umanak had a dozen hens, which laid eggs a part of the year, and which he traded only for schnapps.

The snowy peaks of Kangek half-veiled in curling clouds the lovely blue of Disco Bay, and the countless icebergs ever drifting southward from the ice-fiords near, pleased the eye, while the torrents of Arveprins Island plunging into the sea made music for the ear. It seems now to me the most idyllic of my Arctic experiences.

From Ritenbenk we steamed slowly northward through the Waigat Strait, which separates Disco Island from the mainland. Low clouds covered in many places the high land, which on either hand rose from three to four thousand feet in precipitous heights, which generally reached the very sea on the island, but which were abutted on the main-land by frequent, gentle slopes, covered by pleasing verdure. Along the Disco coast are a number of coal-mines, which have been known a century.

We were not ill-pleased to sight Hare Island, and enter the free sea of Baffin Bay, just as strong wind and rain came. The navigation of the Waigat is extremely dangerous in foggy and stormy weather, owing to the thousands of icebergs which are ever present in its waters.

Occasionally the clouds broke, and afforded fine views of the rugged, rock-bound coast, which is of the most precipitous character. Though much pleased with Svarte Huk, yet our interest centred in Sanderson's Hope, that beautiful, commanding headland, which was sighted by John Davis three centuries



ICEBERGS IN DISCO BAY.

(From a photograph.)

ago. The capriciousness of an Arctic summer cut off by its fog all view above that point, and we lay many tedious hours off Upernivik until a favoring wind rolled back the curtain, and allowed our native pilot to show us the safe way into the wretched cove which is called a harbor.

Our first experience was a heavy squall, in connection with a touch of the Greenland *Foehn*, which caused the chafing and subsequent breaking of one of the hawsers, and the *Proteus* drifted against a rock, from which she swung free without damage, through Captain Pike's prompt measures.

The first American soldier enlisted in Greenland was doubtless Private Maurice Connell of the expedition, who was discharged by expiration of term of service, and re-enlisted at Upernivik.

Inspector Smith had arrived before us, and had interested himself in the supplies wanted. It was found that only ten suits of clothing, made to order for the expected Danish international station, could be procured, and that boots, which we much needed, could only be had by a week's delay.

The two Eskimo dog-drivers were lacking, but two men at Proven were highly recommended, and I decided to send for them. As Proven was some fifty miles to the south, it was necessary to put the launch *Lady Greely* (as Lieutenant Lockwood has christened her) into the water. A severe westerly gale prevented sailing on the 25th, but the next day, before the storm had subsided, Lieutenant Lockwood started, accompanied by Governor Elberg. They took the inside passage, between the islands and main-land, but it was necessary at one point to venture into the open sea. Lieutenant Lockwood returned on the 28th, bringing two Eskimo, Thorlip Frederik Christiansen, aged thirty-five, and Jens Edward, aged thirty-eight. These men were contracted with, and joined the expe-

dition the same day, bringing with them their kayaks and hunting implements. They ever proved themselves faithful, industrious, honest, and truthful, as Inspector Smith pledged they would.

Lieutenant Lockwood obtained a considerable quantity of skin clothing at Proven, and Sergeant Rice made several photographs. On the return trip, a few hours' delay at Sanderson's



Sergeant Rice and Greenland Eskimo. (From a Photograph.)

Hope resulted in the addition of one hundred and twenty-seven birds to our larder; guillemots (Bruennich's) and little auks (*Mergullus alle*). Lieutenant Kislingbury, at the same loomery, had also obtained three hundred and five auks and guillemots. An Eskimo who accompanied Lieutenant Kislingbury's party with his kayak while picking up birds capsized, and not handling his double-ended paddle with sufficient skill to recover himself, would have perished but for assistance from the whale-

boat, which was promptly rendered by Sergeants Brainard and Connell.

During these days I had an opportunity of seeing Upernivik and its surroundings. The name in Eskimo means spring; but, although Inspector Smith told me that in fourteen years it had not before been so green, it did not present an attractive appearance. The island, though not very rocky, yet had a barren, desolate look, with but few spots of scanty vege-



Tasiusak.

[*The most Northerly Settlement of Danish Eskimo.*]

tation. From the highest ground there is a view of Augpadlarsok ice-fiord, which claimed my daily attention. The fiord sends out thousands of icebergs yearly, and its glacier front is a sight to be long remembered.

To the northward the projecting, rugged coast cut off the view of Tasiusak, the most northerly of the settlements of the Danish Eskimo, a dreary spot difficult of access and rarely visited.

Governor Elberg showed much courtesy to the expedition,

but his greed for gain appeared to have overcome that sense of honesty which is so general in Danish Greenland. His prices for supplies were very high, and his sale of infected dogs caused the loss of the greater part of my draught animals, and later seriously affected our geographical success. I suspected disease from a dog hung up by the neck, but its existence was denied by him.

The usual Greenland hospitality was shown us at Upernivik, not only by Inspector Smith and Governor Elberg, but also by the gentle, kindly-hearted Danish priest and his good wife. Greenland hospitality is most frequently shown in what seems to be the only possible way in that remote country—by the proffer of every variety of wine or liquor in the larder, and in urging a most indiscriminate participation of them. It requires much tact, judgment, and discretion to avoid giving offence by refusing, but at the same time, to escape unpleasant consequences, it is sometimes necessary to do so.

At last the unruly dogs were on board, the bewildering accounts with Danish values adjusted and settled, the winding channels to the westward between rocky islets and sunken ledges safely passed, the final farewells and hearty God-speeds uttered, and with high hopes and strong courage we left Upernivik and civilization behind, to adventure the dangers of the high north.



Upernivik at Midnight.

CHAPTER III.

MELVILLE BAY TO FORT CONGER.

WE ran northward until Berry Islands were sighted, and, noting the entire absence of ice, other than the numerous bergs from Augpadlarsok fiord, I ordered that a direct course be laid for Cape York, believing that the "middle passage" would be both practicable and safe at that late season of the year, especially as the spring and summer had been so unusually warm. The ship was running at full speed in an iceless sea as I went to rest at midnight. It should be remembered that we had long been in the region of perpetual daylight, if not sunlight; for, though the sun sets not in the far north, yet the prevalent Arctic fog hides his face for days at a time.

Our run on July 31st was through an open sea, in which no semblance of a pack was noted until about 5 P.M. It then consisted of small pieces of pancake ice, which would in no way interfere with the progress of any steaming vessel; it was scarcely three miles long, and barely reached a mile or two to the westward.

As we were passing the northern edge of this pack, a Polar bear was descried on a small piece of pan-ice. He was busily engaged in eating a young seal which he had just caught, and apparently did not notice the vessel until it was within a half mile of him. He ran a few yards from the seal, but later returned to it, and, strangely enough, seemed much disinclined to leave the ice for the water, returning to the floe after a temporary plunge. A large number of shots were fired at him from the vessel, one or more of which seemed to strike him. The *Proteus* was stopped and a boat lowered, in which Lieutenants Kislingbury and Lockwood, with one or two others, effected his capture. He was killed by a bullet, probably from Lieutenant Kislingbury's rifle, but for many days there were long and unsatisfactory discussions as to whom should be awarded the credit for his death.

Our bear was a young one, seven feet six inches long, and probably of some six hundred pounds weight. His flesh was quite palatable, more so, it was generally considered, than that of the cinnamon of our own country. He was photographed by Sergeant Rice, and skinned by the Eskimo.

No further ice was met with, and at 4 P.M. of the 31st the mate and quartermaster, through a break in the light fog, sighted land, which must have been the high cliffs of Cape York. The fog grew denser, instead of breaking as we hoped, and obliged the vessel to run at half speed until 8 A.M., when the speed was reduced to steerage-way, as the dead reckoning put us in the neighborhood of Cape York. Later the fog broke for a few moments, and showed land some five miles to the northward, but closed again before it could be identified. We were obliged to remain under steerage-way during the rest of the day, and scarcely ran more than twenty miles.

The remarkably open condition of Melville Bay had enabled

us to make an unprecedentedly rapid crossing, but thirty-six hours' time being occupied in its passage.

The ice of Melville Bay is justly dreaded, but in latter years, steam, experience and modern equipment have done much to insure the safety of its regular navigators, the hardy whalers, who brave its dangers at the earliest moment, and under the most unfavorable conditions. For years their vessels have been boldly pushed into the ice in May, and at least two sea-



Cape York.

sons have seen them in the "North Water," near Cape York, as early as June 3d.

Discovery- and relief-ships have hazarded nearly sixty times the perils of ice-navigation within its limits, and invariably without loss of life or vessel. This immunity from disaster has arisen from their usual practice of attempting the passage of Melville Bay much later than the whalers,—at a time when navigation is substantially safe,—in July or August. Except the Relief Squadron of 1884, and McClintock in the Fox, I recall no vessels of that class which have entered its ice in June.

During the day and evening the compasses unfortunately gave

us much trouble, being very sluggish, and consequently unreliable.

Several soundings, from six to eight miles west and southwest of Cape York, gave no bottom at one hundred and eighty-five fathoms. A layer of warm water was found between the surface and the greater depth, the temperature of the surface varying from 33.2° to 35° ; at five fathoms, 35.7° to 36.7° ; and at one hundred and eighty-fathoms, 31.5° .

A young male square-flipper seal (*Phoca barbata*) was killed on a detached ice-floe during the day.

On the morning of August 1st the fog lifted, and the vessel's position was found to be about twenty miles southwest of Petowik glacier, which lies just northward of "The Crimson Cliffs" of Sir John Ross. A sounding thirteen miles west of the glacier gave rocky bottom at one hundred and ten fathoms, and a temperature of 35° at surface and five fathoms, which remained steady as we ran inward and obtained a second sounding, with mud bottom at seventy-two fathoms, two miles off the glacier front. The heavy sea prevented successful photographing of the glacier.

Some patches of snow of a dirty reddish color were observed from the Petowik glacier northward toward Wolstenholme Island, being without doubt drifts of the famous red snow, first discovered by Sir John Ross, in 1818. Though desirous of obtaining specimens of *Protococcus nivalis*, which gives the color to this snow, I was unwilling to land for that purpose alone. The vegetable character of this phenomena has been quite clearly settled by Dr. Robert Brown.

At 10.15 A.M. we were off Wolstenholme Island, and at 1 P.M. left it behind, as we laid our course for the Cary group.

Icebergs, which were rare in the neighborhood of Cape York, were found to be very numerous near the northern end of Wol-

stenholme Island, and in one of these a large spot of the deepest and most exquisite blue was seen, which contrasted finely with the bluish-white of the main berg, and was sufficiently marked to remain visible for nearly an hour.

The Cary Islands were sighted at 3 P.M., and about two hours later the Proteus stopped at the north end of the southeast island of the group. To the southward of this island, at least thirty large icebergs were seen, evidently grounded, but elsewhere there was scarcely a particle of ice in sight.

Lieutenant Kislingbury and Dr. Pavy examined the cairn erected by Sir George Nares in 1875, and visited by Sir Allen Young in the Pandora (afterward the Jeanette) later that year and again in 1876. The records left by the latter officer were found in good condition, wrapped in a number of the London *Graphic*. A copy of these records was left, and a short note was also deposited, giving a brief account of our visit to the island, for the information of our successors.

The enthusiastic photographer of the expedition, assisted by some of the men, succeeded with great difficulty in transporting his apparatus to the summit of the island, which is some five hundred feet above the sea, and obtained a photograph of the cairn. The island is so rough in general that it is with some trouble that an unencumbered man can ascend the greater part of its cliffs. Vegetation was exceedingly scanty.

The depot of thirty-six hundred rations, left by Sir George Nares in 1875, was found in a small cove at the southern point of the island. The supplies were located on a rocky shoulder, some thirty feet above the sea, which commanded Baffin Bay to the southwestward. The depot was in quite good condition, excepting a certain portion of the bread, which was found to be somewhat mouldy, though still eatable. The bread which was bad was in casks which had been left with the head upward,

while that in the barrels, which were on their sides, appeared to be in perfect condition. The cans of Australian beef were laid in rows on the surface of the bare rock, so that they had been alternately exposed to the direct heat of the summer sun and subjected to intense winter cold from radiation. Notwithstanding this severe trial, the cans of meat tested were in good condition—strong proof of their original good quality.

It would seem advisable that caches of such kind should be at least covered, so as to avoid both direct sun and intense cold. Thus protected they would longer remain serviceable.

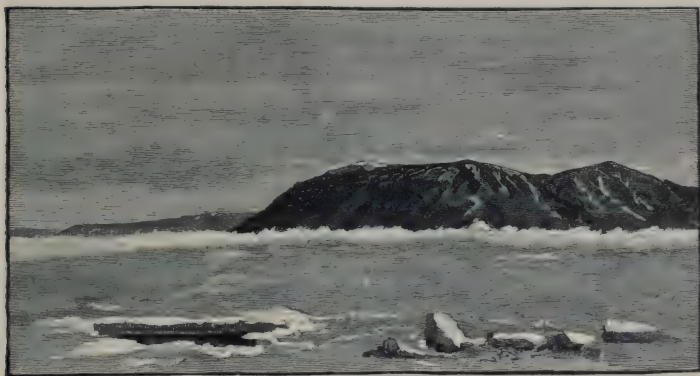
The whale-boat was carefully examined, and found to be in serviceable condition, despite the long time it had been cached.

Quite a number of pieces of drift-wood were found upon the western shore of the island, among which were a worn but still serviceable oar, and a charred piece of the ornamental work of a ship. I am informed that the whaler *Xanthus* was burned the previous year just north of Tasiusak. It is probable that the burnt wood was from the *Xanthus*, as it evidently had not been exposed any very great length of time to the action of the sea. The fragment was in any event of an old vessel, as it had originally been painted red and yellow, and later a coat of white had overlain it.

The presence of this drift-wood is interesting, as showing that a northwest current extends occasionally this far to the northward in Baffin Bay. Inglefield mentions finding near Cape Atholl a portion of a ship's deck, which was evidently part of an American whaler which had been lost in Melville Bay that year. He considered this as giving evidence of the strong northerly current along that coast, especially as the fragment had drifted so far in a few weeks despite the heavy northerly gales.

Sir George Nares, in 1875, experienced a southerly current, which is doubtless the prevailing one.

We left the Cary Islands at 8 P.M., and five hours later were abreast of Hakluyt Island, which is particularly interesting, as being the farthest land touched by William Baffin in 1616, although he sailed some eight leagues to the northward of this point. Inglefield was hardly fair to the old explorer when he claimed Northumberland and the adjacent isles as newly discov-



"An Island we called Hakluit's Ile."

[*Baffin's Farthest Land, July 4, 1616.*]

ered, for it is evident that Baffin must have seen these islands as well as Hakluyt, although the map of his remarkable discoveries of 1616 is lost to the world.

From Cape Chalon northward a close watch was kept upon the main-land, in hopes some Etah natives might be seen and communicated with by us.

The remarkable tabulated masses of land in the neighborhood of Cape Alexander have been made familiar to the world by the vivid descriptions of Kane and Hayes, with whose labors they must ever be associated.

To the southward of that cape the great Mer de Glace is

nearly always in sight from the open sea, and, being a predominating feature in the landscape, naturally conveys a sense of barrenness and desolation; but to the northward the inland ice has retreated far from the sea, leaving the land free from ice or snow, and broken in at many points by fertile valleys, which impress themselves more strongly upon one through their contrast with the shores just passed.

Along the coast only an occasional bit of ice-foot was seen, and in the sea but a single berg and a few pieces of floe-ice to the southward of Littleton Island.

Pandora Harbor was passed at 10 A.M., and at noon the Proteus anchored between Cape Ohlsen and Littleton Island.

Lieutenant Kislingbury, with a party including the Eskimo, was sent to Life-Boat Cove to examine the winter quarters of the crew of the Polaris, and open communication with the Etah Eskimo, if any could be found. They brought back the transit instrument, which was found badly damaged about fifteen feet from the cairn in which it had been originally deposited. Polaris house had entirely disappeared, but its site was marked by a cooking-stove, steam-gauge, and many different pieces of metal, but no wood. A thermometer scale was found which belonged to an instrument manufactured by Tagliabue, scaled from 120° down to minus 100°, and on which the name of Hall had been scratched with some pointed instrument.

Lieutenant Lockwood improved our stay by landing a quantity of coal on the extreme southwestern point of Littleton Island, the only article of our supplies which could well be spared.

While these parties were thus engaged, I thoroughly examined the island for the purpose of finding the mail which had been landed there in 1876, for the ~~Nares~~ expedition, by Sir Allen Young. Some fifty cairns, great and small, were found, none

of which contained a record save one, which informed us that the whaler Erik, under Captain Walker, touched at the island June 20, 1876. Six hours' fruitless search on foot had no results; but later, taking a boat, I followed the coast with two men, along the shore from fifty to two hundred yards from the water's edge, so as to cover the entire ground, and eventually succeeded in discovering the mail at the extreme northern end of the west coast, some thirty yards from the water's edge. Four boxes and three casks of mail matter were discovered, marked by a very small cairn, which contained no record.

On the western coast of the island I also found a wet wad of paper, which was carefully dried, and examined a few days later. It seemed to show conclusively that the Nares cairn had been opened, probably by the Eskimo, as the paper proved to be part of the London *Standard*, dated May 17, 1875, in which was contained intact an account of a lecture of Captain Nares on the Arctic expedition, delivered at Winchester Guildhall, April 30, 1875.

While at Littleton Island, walrus were found in considerable numbers. The party which visited Life-Boat Cove encountered a herd near that point. Two of the animals, a female and her calf, were fired at and wounded. The calf sank, and was possibly killed. The female, after one plunge, came again to the surface, and, infuriated by her wounds, rapidly approached the boat, evidently with hostile intentions. The Eskimo, who better than the rest realized the danger, counselled a retreat, but two shots at a few yards caused the walrus to dive again, and she appeared no more. The boat landing coal had similar experiences, except that the entire herd when fired on rapidly approached the boat with threatening actions, but drew off when very near. Their great strength, enormous size, and ferocious appearance are very trying to inexperienced hunters, and these qualities, added to

fearlessness and curiosity, make it a dangerous animal to attack in its own element.

The full-grown walrus is from twelve to fifteen feet in length, has a small, short head, with strong bristles about the size of large darning-needles. The broad fore and hind paws are about two feet long, and the tusks of adults generally about a foot and a half, although they have been known to exceed thirty inches, in length. The tusks of the female are much more slender than those of the male. They are very gregarious, and seem to find a certain pleasure in frequent bellowing, by expelling the air through their nostrils.

The northern portion of Littleton Island appeared to be a favorite resort of eider ducks. Hundreds were found nesting, but from the lateness of the season the eggs were unfit for eating. The nests were beds of rich, soft down, which were but partly concealed by adjacent rocks or vegetation. The female birds left their nests with great reluctance, and only when approached within a few yards. Our larder was increased by only eleven ducks, as no time was given to hunting.

Private Henry discovered at a low point on the south side of Littleton Island, opposite Cape Ohlsen, the remains of an Eskimo woman buried in an old Eskimo house. The house was carefully examined by me, and evidently had been at some time a permanent habitation. Not only the house itself, but the external surroundings, and the rank and luxuriant vegetation near, were quite conclusive on that point. From the location of the body, it is possible that this was the last of a family. Inglefield states, that a winter hut at Bardin Bay was found blocked up by a stone, which removed disclosed the dead body of a man within, and he was advised that it was a frequent custom to let the house form the tomb for the last of a family.

An accident had occurred to the wheel just after passing

Cape Alexander, and the stop at Littleton Island was improved by putting it in order, which delayed us until nearly midnight.

I should have been glad to have visited Hayes' old winter-quarters in Port Foulke, a few miles south of Littleton Island, in hopes of seeing some of his old Etah friends, but lack of time forbade.

The view from Littleton Island to the northward some forty miles showed the sea entirely free from ice. Aware of the extreme rapidity with which ice conditions change in that sea, I



Port Foulke.

[*Winter-quarters of Dr. Hayes, 1860-61.*]

decided not to touch at Cape Sabine to examine the sledging depot at that point, but to shape a direct course for Cape Hawks.

Cape Sabine was passed about 2 A.M., and shortly after small amounts of floe-ice were seen, but not in sufficient quantities to form even an open pack. To the westward, in Buchanan Strait, what appeared to be an ice-foot was seen, but from later experiences I am satisfied that it was a series of low floes, or more probably the unbroken ice of the previous winter.

At 4 A.M. a seemingly close pack was seen to the eastward.

but later it developed into stream-ice of small extent. I came on deck at that time, and found our position to be off Cape Camperdown. The scene then was one of remarkable beauty, and, rather than an Arctic night, seemed to recall a bracing October morning in New England. It was probably about the turn of the tide, as the entire sea was as smooth as a mill-pond. In occasional places during the night, a bare film of new ice had formed which indicated the approach of winter.

At 4.30 A.M. we were opposite the centre of Bache Island, and from its appearance to me at that time, from the bridge of the *Proteus*, I could readily understand how Hayes mistook the single island for two. A long, broad valley separated Victoria Head from Cape Albert, and its vanishing point was many miles to the westward.

The vessel was stopped a few moments, in order to obtain a photograph of Bache Island and the land to the westward. The landscape at that time was one of unusual interest. The sun appeared especially brilliant, the sky was free from all except a few delicate cirrus-clouds, and the air was in that state of visibility which renders the outlines of distant objects particularly sharp and distinct. The entire coast of Ellesmere and Grinnell Lands was not only visible through the air, but its image was perfectly reflected from the smooth sea. The view of that shore was clear and distinct, from Cape Sabine northward to Cape Napoleon. To the southeastward, near Van Rensselaer Harbor, made immortal by the heroism of Kane, the highlands were plainly visible.

Although the expedition, as a rule, was little given to sentiment or enthusiasm, yet the scene and its conditions caused general excitement and the deepest feeling. But three vessels had ever before attained so high a latitude in those waters, and none with such ease; and the appearance of these Arctic lands,

devoid, as a rule, of snow, and glorified by the rays of the autumn sun, presented a prospect which was entirely different in its details from any we had ever anticipated. The stern grandeur and desolation which are marked characteristics of Arctic landscapes were not wanting, but the poetical picturesqueness and delicate beauty of the scene were its predominant features.

The absence of ice was particularly marked. The north end of Bache Island was reached at 5 A.M., and at that time but few pieces of floe- or harbor-ice could be seen in Kane Sea, and but two bergs were sighted from Cape Sabine to Cape Hawks.

To the northward of Bache Island, the ice of the previous winter still remained solid and unbroken in Princess Marie Bay, to the westward of Norman Lockyer Island.

A photographic view of Cape Hawks and the coast to the northward was obtained at a point some eight miles distant from that cape, which, though not valuable as a photograph, was useful for topographical purposes.

Cape Hawks was passed, and the *Proteus* stopped at 9 A.M. opposite the rocky ledge in Dobbin Bay on which the English depot of 1875 had been cached.

While Sergeant Rice, the photographer, was diligently plying his profession from a large floe of harbor-ice, I visited the depot and carefully examined its contents. At the time of our visit the tide was low, and at the edge of the land we were confronted by a perpendicular ice-wall of eight to ten feet in height, which was scaled with some little difficulty.

Seven casks of bread, aggregating twenty-seven hundred pounds; two casks of stearine, of four hundred pounds; one barrel of preserved potatoes, two hundred and ten pounds; two kegs of pickles, and two partly filled, kegs of rum, composed the remains of the depot. These articles were in good condition, except a portion of the bread, which was mouldy, though

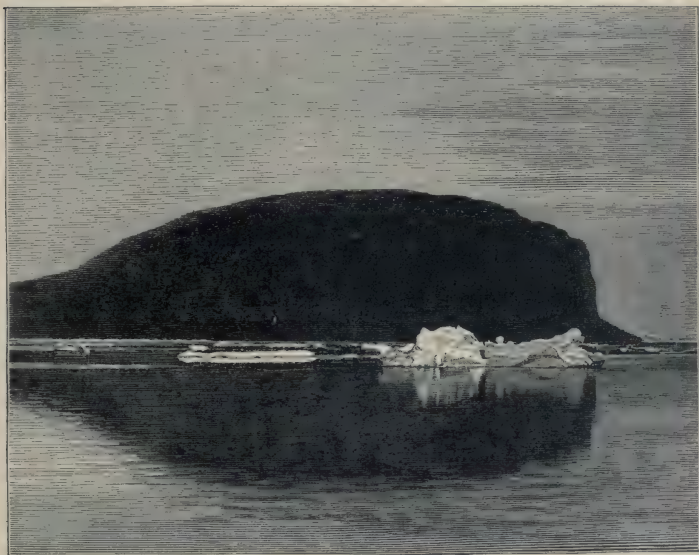
generally eatable. The casks had been deposited on a ledge of uneven surface, and the melting snow in summer had gathered in pools around, and later had frozen them from an eighth to one-half deep in solid ice. The casks were all cut out of the ice and placed in such location as would better protect them from the moisture. A half-filled keg of rum, the piccalilli, and sample cases of the preserved potatoes were taken with us, as well as the jolly-boat, which was also cached there. Insufficient means had not allowed the proper equipment of the expedition with boats, or this would have remained undisturbed at Cape Hawks.

The excellent workmanship and fitness of this boat for Arctic service was exemplified by the fact that, despite its six years' exposure to the dry Arctic atmosphere, it was yet in such condition that, though leaking, it was seaworthy at once. It was named the *Valorous*, from the ship to which it formerly belonged.

The cache at Cape Hawks, deposited by the English in 1875, was one of the two principal depots established under the advice and direction of a board of Arctic experts, who had given the subject of exploration by the Smith Sound route careful and considerate attention. The second depot consisted, equally with that of Cape Hawks, of thirty-six hundred rations, and was the one which had been visited by us August 1st, at Southeast Cary Island. The very small cache established at Payer Harbor, Cape Sabine, was for use, as Sir George Nares said, of any possible sledge party travelling in that direction. It contained only two hundred and fifty sledging rations and a small quantity of dog-food.

It is now evident to the whole world that Cape Sabine is the key of Smith Sound, but such fact was by no means clear to the English Arctic board, while the problem was an unre-

solved one. If the English expedition of 1875 had lost their ships, the four weeks' provisions at Cape Hawks could never have carried their crews to Southeast Cary Island, except under favorable conditions, which rarely occur in Kane Sea. This statement, showing that the views of the highest and most competent Arctic authorities were followed in our original plan, by



Washington Irving Island.

[Opposite Cape Hawks.]

no means precludes the admission that Cape Sabine should have been provisioned at that time.

Five walruses were seen at Cape Hawks, which, in connection with the observations of the English on Norman Lockyer Island, indicate that these animals yearly frequent that part of Kane Sea.

The serial sea temperatures at Cape Hawks showed a fall in the temperature of the water since Cape Sabine had been

passed ; that of the surface being 32.3° , and at thirty fathoms 30.7° .

The vegetation at Cape Hawks and on Washington Irving Island was scanty and stunted. Three varieties only of plants were found on the main-land and eight on the island.

As the *Proteus* passed Washington Irving Island, we picked up our photographer, as well as Dr. Pavy and Lieutenant Lockwood, who had been searching the cairn on the island. The latter officer brought back Captain Nares' record of August, 1875, and September, 1876, which gave a brief account of his visit and action. Copies of these papers were left, and a new record added, which gave briefly our experiences to date. The old cairn was carefully rebuilt.

The harbor-ice of Dobbin Bay was solid and unbroken. Its margin reached the north end of Washington Irving Island, so that we were obliged to pass to the southward on leaving Cape Hawks.

At 3 P.M. Cape Frazer was reached, from which Washington Land of Kane was first sighted, the high land to the northward of Cass Bay showing up clearly. This point, Cape Frazer, is a notable one in more than one respect. It was Hayes' farthest thirty years ago, while serving as a surgeon with Kane, and it is in the immediate neighborhood of this cape that the Atlantic tide, surging northward through Davis Strait and Smith Sound, meets its sister tide twelve hours older, which has passed northward by the Spitzbergen Sea, and rounding Cape Washington has flowed southward through the Polar Ocean and Robeson Channel.

In the neighborhood of this point the first palæocrystic floebergs fell under our observation. To the uninitiated, rough and heavy field-ice, which has been increased in thickness by underrunning or doubled up by pressure, may be mistaken for

palæocrystic, but the latter ice once seen the mistake never occurs again. Its identity is unmistakable.

Four floe-bergs only were seen, two to the northward and two to the southward of Frazer, and no palæocrystic floe was met until Cape Baird was reached.

At 5 P.M. Cape McClintock was passed and the eightieth parallel crossed. Scoresby Bay was not only full of harbor-ice, evidently unbroken that year, but a delicate fringe of new ice at its margin extended a mile or more into the sea.

Fog and drizzling rain set in shortly after, obliging us to run at half-speed. It was so dense on sighting Cape Collinson, at 5.30, that I did not feel justified in attempting the examination of the small depot there cached, particularly as its exact location was not known, and the search would have necessitated securing the vessel in Richardson Bay. At 10 P.M. the fog was so dense that the vessel was kept merely under steerage-way during the rest of the night.

The fog lifted on the morning of the 4th sufficiently to allow an hour's run, and Franklin Island was passed about noon. We obtained a sounding of one hundred and thirty fathoms with no bottom, at a point some eight miles southwest of that island. To the southeast, a close, hummocky pack was sighted, which was of such limited extent that from the "crow's-nest" open water was visible on both sides.

At noon Kennedy Channel was entirely free from fog, and both coasts showed up plainly, from Cape Constitution to Poularis Promontory to the east, and from Cape Lawrence to Cape Defosse to the west.

I decided to establish a small depot in Carl Ritter Bay, and while the *Proteus* remained in the extreme northeastern portion, I went on shore with a party and cached two hundred pounds of meat and about two hundred and eighty pounds of

bread. The pemmican and hard bread in water-tight casks, were placed on a high bench on the north side of a creek about a half mile southwest of the cape near Mount Ross.

This creek was of moderate size, and drained a valley of considerable extent, which extended to the northwestward. The vegetation seemed more abundant than at Cape Hawks, and eight varieties of flowers were gathered during our brief stay, but the general appearance was of desolation.

Lieutenant Kislingbury travelled up the valley a short distance, and traces of musk-cattle, hare, and fox were found.

A number of delicate star-fish and crustaceans were obtained in a sounding of forty-two fathoms half a mile off the shore.

The designation of the indentation at that point as a bay would seem to be a courtesy on the part of our English cousins toward Dr. Hayes, who located there an inlet some twenty-five miles deep. The actual indentation is so slight, and the curve so great, that it is a bight rather than a bay.

On our passage northward, Richardson and Rawlings Bays were not seen by us, but all indentations sighted were filled with unbroken harbor-ice. Carl Ritter Bay itself was free of such ice, which must originally have formed so intimate a part of the main pack that it must have moved out in the first break up of the year.

From Littleton Island northward the number and variety of birds rapidly decreased, and north of the eightieth parallel only dovebies had been observed until we left Carl Ritter Bay, when a Greenland falcon (*Falco candicans*) was seen.

At 8 P.M. off Cape Lieber, a large number of heavy floes were met with, which pressed against the coast and obliged the Proteus to make a considerable detour to the eastward. In passing the ice near Cape Lieber, for the first time in our voyage,

the "crow's-nest" was of practical benefit to us. At 9 P.M. we entered the extreme southeastern part of Lady Franklin Bay, about two miles southeast of Cape Baird.

On nearing that cape we met a close, heavy pack, and for the first time in our remarkable voyage were stopped by ice. We ran seven or eight miles to the eastward in hopes that a lead to the northward might present itself. The result of our observations showed a dense polar pack of palæocrystic floes, cemented together by thinner ice, which extended in a semi-circle from Cape Baird to the Greenland coast above Cape Tyson. These floes ranged from twenty-five to fifty feet in thickness, and proved to be veritable islands of ice—the true palæocrystic floes of Nares.

We returned to the neighborhood of Cape Baird, and tied up to the pack to await future movements of the ice.

On August 5th, with a small party, I visited and examined carefully Cape Lieber, which was about four miles distant. The precipitous cliffs rise some two thousand feet from the sea, and it is possible to scale them only at one point, through a rugged, rocky ravine, which the summer stream in course of ages has worn through the disintegrated rock. The ascent was made only with great difficulty. Lieutenant Lockwood and Dr. Pavy climbed different peaks at the extreme summit, which was entirely barren, save miniature glaciers in two places. No cairn of any kind was in sight, though any present could not have failed to meet the eye, nor were there any other traces of a previous visit. Two small cairns were erected by our party.

The Grinnell Land coast was visible many miles to the northward, a rugged, bold highland, although its mountain masses presented to the eye very gently rounded contours, with no distinctly rising peak in any direction.

Through the pack in Hall Basin there were many lanes of

water visible, and the general movement of the detached pieces showed a southward tendency.

That evening we were able to advance about a mile toward Discovery Harbor, through a large number of floes breaking off and drifting slowly southward.

During the day a number of schools of white whales (*Beluga catadon*) were seen, there being as many as thirty at one time. Mr. Norman, the mate of the *Proteus*, saw with them their active enemy, a sword-fish (*Orca gladiator*, Bonn.)

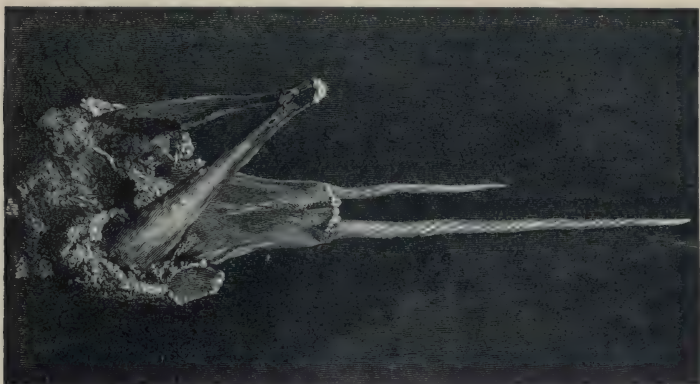
On the 6th a number of narwhals (*Monodon monoceros*) were seen, and another school of white whales. The two Eskimo pursued them in their kayaks, and Jens succeeded in striking a narwhal, but after an exciting struggle, during which he came to the surface of the water twice, the animal managed to break the line and carried away the harpoon with him.

The white whale is from twelve to eighteen feet in length, and yields not far from a thousand pounds each of meat and blubber. It is a very beautiful animal, with a smooth, unwrinkled hide, which is of waxy-white color in adults, but of a light grayish brown in the young. They are very active, swim with great rapidity, and usually travel in schools. In Greenland from five to six hundred are caught yearly, almost all by nets. The skin, called "mattak" by the Eskimo, is esteemed a great dainty in Danish Greenland when fresh, and that eaten by me tasted like a superior kind of tripe. It is much valued as an anti-scorbutic, and we obtained a considerable quantity of it dried, in which condition it resembles pieces of inferior glue.

The narwhal, or unicorn, is of a yellowish-white color, mottled with dark grayish spots in the adult. In the young both ground-color and spots are of considerably darker shade than in the full grown. The strikingly characteristic feature in the male is an abnormally long tooth projecting from the *left* side

of the upper jaw, its fellow of the right side being almost always undeveloped. In the females both teeth are immature, as a rule. This tusk is sometimes developed to a length of ten feet, and, as the body is not much longer, it gives the animal a most striking appearance.

The tusk points slightly downward, is nearly straight, is spirally striated, tapers to a blunt point, and is of a yellowish-white substance, denser and harder than ivory. The spirals



Narwhal Skull.

[Showing Abnormal Development of Tooth in Left Side, Upper Jaw.]

terminate some six inches from the point, which is smooth and white as if from constant use. The tusk varies in thickness from two to three inches at the base, and from one-third to one-half inch at the point. Its use is not definitely known, but most probably it serves as a weapon, as but few are obtained in perfect condition. The animals are quick swimmers, active, gregarious, not easily alarmed, and are often found with the white whale, which they follow. The tusks and oil are valuable, and the flesh palatable. They are hunted by the Eskimo from the kayak only.

The sword-fish, or grampus, is a different species from the

common sword-fish of lower latitudes. It is a fierce, voracious fish of the dolphin family, possessing great strength and activity, and pursues whales and seals with ruthless energy. Dr. Eschricht is said to have taken thirteen porpoises and fourteen seals from the stomach of one of these voracious animals, who was choked swallowing yet another seal.

We saw many dovekies, and shot several during the day; they frequent the cliffs of Cape Lieber, and evidently breed there.

An attempt was made in the evening to reach Cape Baird over the floe, but some changes in the ice appearing probable, the party was recalled.

Several brent geese, a boatswain, and a snowy owl visited us during the day.

On the 7th a northeasterly wind prevailed, which sent large quantities of heavy ice down Kennedy Channel, and obliged the *Proteus* to frequently change her location to avoid besetment, and at 10 P.M. we were tied up to a floe in Kennedy Channel, five miles south of Cape Lieber. Many of the floes which passed south were from one to five miles long, and from ten to fifty feet thick.

In order to be on the safe side, the captain made arrangements during the day for a possible nip, so that the propeller-screw and rudder could be readily hoisted. We were then in a large, open-water space, ten miles long and from one to five miles broad, with the main pack to the northward and the detached floes to the southward.

White whales were again seen, and a number of birds, including the snow bunting, ringed plover, and ivory gull.

During the 8th the pack from the northward filled Hall Basin completely, and Kennedy Channel to the southward of Bessels Bay, while the detached pack to the southward appeared to be

caught between Hans Island and the north cape of Carl Ritter Bay. In case of a heavy northerly gale, if the main pack had broken, the only available shelter would have been at Hans Island, which possibly could have been passed to the eastward. The narwhals still remained with us, and several were seen during the day, and a number of seals, one of which was shot.

On the 9th the ice opened considerably, but snowy weather prevented movement in any direction. A square-flipper seal (*Phoca barbata*) was killed; a falcon, tern, and glaucous gull were seen.

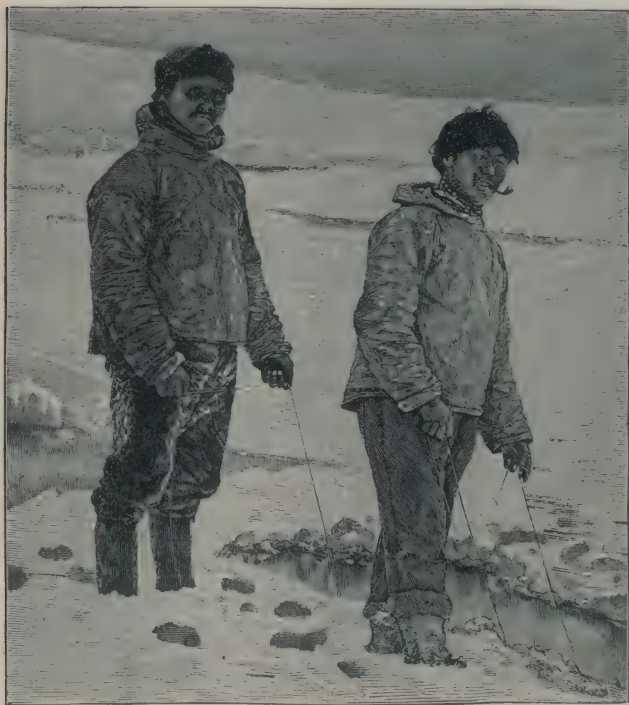
We were surprised to see on the 10th a harp seal (*Phoca Groenlandica*), which, as well as dovekeys and a number of gulls, visited the vessel. Snow still continued, which obscured the land for the greater part of the day, and with continued inaction was very trying to our spirits.

It was true that the situation remained unchanged, and no ground was lost to the southward, but our position was by no means encouraging. Since the 4th of the month we had lost over forty miles of latitude, and instead of being eight miles from our destination were nearer fifty. It was, therefore, with a peculiar feeling of gratification that we saw the wind, shortly after noon, back from the north to the favorable southwest quarter.

On the morning of the 11th the sky showed signs of clearing, and at 7 A.M., under the influence of a southwesterly gale, the fog lifted to the northward. Very little ice was then in sight, and what there was crowded well to the eastern coast. We were then off Hans Island, from which we started northward at full speed, and on rounding Cape Lieber were delighted to see Lady Franklin Bay equally clear of ice.

The southwest wind continued strong, and at 2 P.M., while we were crossing Archer fiord, attained an hourly velocity of thirty-six miles.

On reaching the entrance of Discovery Harbor, a narrow channel free from ice was found, separating the main ice of Archer fiord from a considerable pack which was visible in Water-Course Bay. Discovery Harbor was in the same condition as the bays to the southward—covered with heavy harbor-ice of the previous year's formation.



Eskimo Boys Fishing.

The Proteus steamed slowly into the curved water-space to the northward of Dutch Island, the powerful engines stopped, an ice-anchor was thrown on the harbor-floe, and our voyage to Lady Franklin Bay was prosperously ended.



The Proteus in Discovery Harbor

CHAPTER IV.

THE RETURN OF THE PROTEUS.

AS the Proteus neared the entrance of the harbor, a black speck appeared high up on the steep sides of Cairn Hill, which was soon determined to be a musk-ox. The moment the vessel touched fast-ice five or six eager sportsmen started in pursuit of him. Somewhat to the chagrin of the huntsmen of the expedition, he fell a prize to the boatswain, who being in better condition to climb the steep cliffs, first succeeded in getting within gun-shot. At the first ball the bull appeared to start toward the hunter, but a second shot caused him to stag-

ger and fall for some two hundred feet down the steep cliffs, on the edge of which he was grazing.

While the musk-ox was being secured, I went direct to Discovery winter-quarters, where the post-office cairn of Captain Stephenson was visited. Two copper cases were obtained, labelled "Records and General Information," the latter of which, by coincidence, was dated August 11, 1876, just five years previous to a day.

A Hicks glacial thermometer, set five feet in the ground, recorded a temperature of 26° . As the unfrozen ground attains its maximum temperature not far from that time of the year, this temperature seems reasonably the maximum of the earth at that depth. Later observations and experiences show that the earth thaws only to a depth of twenty-two to twenty-four inches, remaining eternally frozen below that point.

About twenty-five barrels of spoiled pork and beef, left by Captain Stephenson in 1876, were standing near, and numerous empty cans and other débris, such as usually mark old encampments were strewn around.

A large flock of eider-ducks had settled in an open pool near by, and to the northward some three-quarters of a mile ten musk-oxen were quietly grazing. The adjacent brook-slopes and margins were clothed with vegetation, composed of thick beds of *Dryas*, or clusters of *Saxifraga*, varied with sedges, grasses, or the familiar buttercup. Higher up, on glacier-drift of clayey nature, countless Arctic poppies of luxuriant growth dotted with fair yellow the landscape. Surely this presence of bird and flower and beast were kindly greetings on Nature's part to our new home.

But in Arctic life one grows practical, and, in default of gun for duck and rifle for musk-oxen, I started to tell the huntsmen to pursue them, but while I was on the way they were discovered

by Lieutenant Lockwood, who with Mr. Clay and Private Ryan, followed them up, and killed all on the south side of Mount Cartmel.

Sergeant Brainard and a party were at once sent out to disembowel and skin the animals, as the musky flavor, which sometimes marks the otherwise excellent meat, is generally attributed to the animals remaining undressed for some time after their slaughter. The indefatigable photographer, Sergeant Rice, accompanied them, and at midnight made a photograph of the animals.

The Captain of the Proteus was desirous of landing the party in Discovery Harbor, but I was unwilling to abandon the contemplated location at Water-course Bay, owing to its proximity to a seam of excellent coal. Lieutenant Lockwood was in consequence sent to examine the existing conditions in Water-course Bay and to report thereon. He returned at 6 A.M. of the 12th, having killed during his absence three more musk-cattle. He reported the coal seam as of excellent quality and easily accessible, and that the shores of the bay were well adapted for a station. The northern half of the bay was then filled with pressed-up floes from the influence of the southwest gale, which yet continued. He thought it doubtful if a vessel could approach nearer the land than one-eighth of a mile, and further reported that no sheltered anchorage was possible.

In view of these conditions I decided to land at the Discovery winter-quarters, where it also seemed that the observations, strictly comparable with those of the English expedition, would better subserve our scientific objects.

The Captain commenced at once breaking up the harbor-ice, a work which lasted for seven hours continuously until we anchored opposite the post-office cairn, and within a hundred

yards of it. It was very troublesome to force a passage, as there was no place for the broken floes to be driven to. The ice averaged sixteen inches in thickness, but in many places it was eight or ten feet. The latter was in moderately rotten condition, or the vessel could never have made its way through it. It was surprising that she did her work so well.



Proteus First Stopped by Ice.

The Proteus would back several hundred yards from the edge of the ice, and then going ahead at full speed would strike the heavy floes squarely with her iron prow. Her impact was such that, surging and rising, she would plunge into the solid ice from half to her whole length. As she moved ahead the entire crew rolled the vessel, so as to give a motion sideways, which

tended to further break up the floes and prevent the ship from being caught and wedged.

Great skill is needed for the proper handling of a ship under such conditions, for she must be stopped and backed before she has entirely lost headway, in order to avoid wedging. Despite Captain Pike's great experience, the ship was several times caught, thus entailing loss of time and expenditure of fuel.

A site was immediately chosen for the house, which was arranged to stand north and south. The men were divided into two parties for unloading the vessel. All were engaged in this task except the necessary scientific observers, carpenters, and one or two who were detailed to secure the musk-meat cached near by.

The station was named Conger, after Senator Conger, who had interested himself specially in behalf of the expedition.

Mr. Clay informed me on the 16th of his desire to return to the United States, saying that he thought such a course calculated to promote the harmony and interests of the expedition. Though regretting to lose his society I could not but concur in his opinion, as the surgeon of the expedition had shown a marked disposition to extreme measures if Mr. Clay remained. Our surgeon was indispensable, and all honorable concessions to retain him should be made. Corporal Starr and Private Ryan having developed physical ailments, which unfitted them for prolonged Arctic service, were also ordered to return by the *Proteus*, much to their regret.

On the 15th the boatswain killed another musk-ox, which went to the crew of the *Proteus*, but later the Captain forbade any of his crew from hunting more, on my representation that the necessities of our situation, separated as we were from the rest of the world, demanded the conservation of these animals for our future use.

At 6 P.M. of the 18th I finally discharged the *Proteus*.

At that time, in addition to all our general supplies, one hundred and thirty tons of coal had been landed.

On the 25th Lieutenant Kislingbury spent the day on the *Proteus* and the next day, dissatisfied with the expeditionary regulations, requested that he be relieved from duty with the expedition. He was relieved and ordered to report to the Chief Signal Officer. Unfortunately the *Proteus* got under way just as Lieutenant Kislingbury was leaving the station, and he was obliged to return to Conger. He remained consequently at Conger, doing no duty, and with no further requirement than that he should conform to the police regulations of the station. He at no time requested to return to duty as an officer of the expedition. An excellent shot and an assiduous hunter, he contributed by his skill at various times to our stock of game and thus to our health and comfort. He accompanied several short sledge parties, as will be noted hereafter.

These unfortunate episodes emphasize the necessity of selecting for Arctic service only men and officers of thorough military qualities, among which subordination is by no means of secondary importance. If in all military commands that element is of great importance, it is of predominating weight in Arctic work, where isolation and self-dependence impose peculiar and rigid conditions. If subsequently the discipline and subordination of the party insured extraordinary success in field-work and in retreat, it was despite the unfortunate commencement.

The *Proteus* made an attempt to leave the harbor on the morning of the 19th, but was only able to reach Dutch Island, where the heavy crowded ice in Lady Franklin Bay, driven in by the easterly storm of the 18th, prevented her departure. She returned to the point adjacent, which was named

Proteus Point, where the rest of her stay was occupied in taking on ballast.

Lieutenant Lockwood, with the launch, attempted to follow the Proteus as she left her anchorage on the morning of the



Sergeant Jewell making Temperature Observations at Fort Conger.

19th, but owing to the extremely heavy ice found it impossible to do so. This was a matter of much regret to us, as, if the launch could have been got into open water

near Dutch Island, she would have been of great service during that autumn.

Hourly meteorological observations had been regularly made from August 8th on board ship, and on the morning of the 19th were regularly commenced on shore. Two days later a tide-gauge was up, and tidal observations regularly commenced.

From the 18th the men and officers were quartered camp-fashion in tents, but from fourteen to sixteen hours' work daily did wonders on our house, and on the 21st the cook's range was set up. The very low temperature made us feel the importance of quarters, especially for such articles as would be much damaged by frost. Already from August 18th freezing temperatures occurred daily, and at 3 P.M. of the 29th the temperature fell below the freezing point, there to remain for a period of nine months.

In the meantime the ice remained piled up at the eastern entrance to the harbor, and the *Proteus*, despite almost daily attempts to leave, was ice-bound in sight. Daily a note was sent to her, that the latest tidings might reach our homes. Finally, on August 26th, she made a desperate attempt, and broke through the dense, narrow strip of packed floes which had cut her off from open water. Archer Fiord was packed with ice, and she was compelled to run northeastward. All followed her movements with lively interest, and about 7 P.M., some miles east of Distant Cape, she passed from our sight, as it proved, forever.

CHAPTER V.

FORT CONGER.

IT was but natural that many a longing glance should be sent after the departing ship, but, on the whole, I doubt not there was a certain sense of relief that the ship had actually gone, and that our work had fairly commenced. While the ship remained in the harbor it caused a feeling of restlessness and uneasiness, which quite disappeared as soon as she departed.

The work on the house was pushed with the utmost rapidity, and by August 25th some of the party moved in ; there being a roof to cover their heads, although the floor and windows were not yet completed. A portion of the party remained a short time longer in the tents which formed our original quarters, some preferring to wait until everything was in order, and their places finally allotted to them ; and others because they realized that the quarters in the house would soon become monotonous, and that it was best to defer their occupation until the last possible moment.

The first Sunday on which I felt justified in resting was August 28th, on which day all unnecessary work was discontinued. At ten o'clock the entire party were assembled, and the programme for future Sundays outlined.

In dealing with the religious affairs of a party of that kind, which included in it members of many varying sects, I felt that

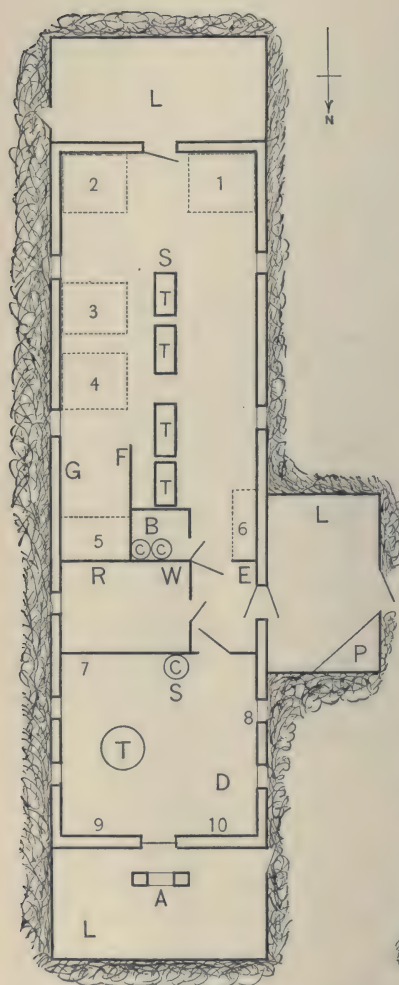
any regulations which might be formulated should rest on the broadest and most liberal basis. I said to them that, although separated from all the rest of the world, it was most proper and right that the Sabbath should be observed. In consequence, I announced that games of all kinds should be abstained from on that day. On each Sunday morning there would be read by me a selection from the Psalms, and it was expected that every member of the expedition should be present, unless he had conscientious scruples against listening to the reading of the Bible. After services on each Sunday, any parties desiring to hunt or leave the station should have free and full permission, and such exercise was deemed by me especially suited to our surroundings, as serving to break in on the monotony of our life, and thus be conducive both to mental and physical health. The selection of Psalms for the 28th day of the month was then read. Although, as a rule, during our stay at Conger, I refrained from any comments on what was thus read, I felt obliged that morning to especially invite the attention of the party to that verse which recites how delightful a thing it is for brethren to dwell together in unity. A few words were added upon the depressing effect which an isolated and monotonous life produced upon men experiencing the trials and hardships of a long Arctic winter. I further expressed the hope, that every one would endeavor to conciliate and reconcile those who drifted into any unpleasant controversy instead of exciting them to further feeling.

That the conditions under which we lived and by which we were surrounded may be known, a brief description of our house and the adjacent country is given as follows:

The house was 60 by 17 feet in the clear. Its walls were double, the two coverings of half-inch boards being separated by an air-space of about a foot. Great reliance was placed on the

non-conductivity to heat of these air-spaces to contribute to our warmth. The inside lining consisted of well-fitted boards, which were tongued and grooved by our own carpenters, but to insure freedom from draughts a covering of thin tar-paper was nailed upon the rafters before the covering of boards was fastened. A covering of much heavier tar-paper was placed on the outside of the external boards. The external wood was fastened vertically instead of horizontally, and though there was but a single covering, yet we managed by strong battening to securely fasten the tar-paper and prevent serious draughts. The roof was but the thickness of a single board, and, like the sides, was covered by tar-paper secured by battening. The paper used for outside covering was of the heaviest character, and, being black, absorbed during the early spring and summer, when external heat was most desired, the rays of the sun to such an extent as to materially contribute to the warmth of the interior. During the winter the external wall and covering of ice and snow prevented any extreme cold from radiation. The house was ceiled with tongued-and-grooved boards, which not only contributed to our warmth, but added also to our room, by affording above an excellent storage-place for various kinds of articles which would have been materially injured by exposure to the weather.

The interior of the house was divided into three rooms, one 17 by 15 feet for the officers, which was separated from the large room of the men by an intermediate space of 8 by 17 feet, of which 6 by 8 feet served as an entry, and a small space of 11 by 8 feet was allowed the cook as his special domain. At the north and south ends lean-tos of canvas and tar-paper were constructed, which served useful purposes as store-houses, and also afforded intermediate stopping-places between the warm quarters and the wintry air. A similar addition was made in the second year to the west side of the house.



1 to 6. Two-tiered bunks.

1. Biederbick, Connell,
Henry, Whisler.

2. Ellison, Schneider,
Cross, Lynn.

3. Salor, Long,
Bender, Ellis.

4. Brainard, Frederick,
Ralston, Gardiner.

5. Jewell, Israel,
Rice.

6. Christiansen,
Jens.

7. Dr. Pavy.

8. Lt. Kislingbury.

9. Lt. Lockwood.

10. Lt. Greely.

A. Pendulum Piers.

B. Bath Tub.

C. Chimneys—double.

D. Desk.

E. Ladder to Garret.

F. Chronograph and Anemometer
Register.

G. Chronometers.

L. Canvas additions.

P. Coal Pen.

R. Cooking Range.

S. Heating Stove.

T. Tables.

W. Water Tank.

 Ice Wall in Winter.

Plan of House at Fort Conger.

Scale, 16 feet to the inch.

The accompanying plan shows the general arrangement of the house and the location of the party. It will be observed that the bath-room abutted against the chimneys, so that this indispensable adjunct of an Arctic house was always comfortable for persons using it. An excellent bath-tub was made, which was in frequent use; the order requiring complete ablutions weekly being necessary only as a matter of form.

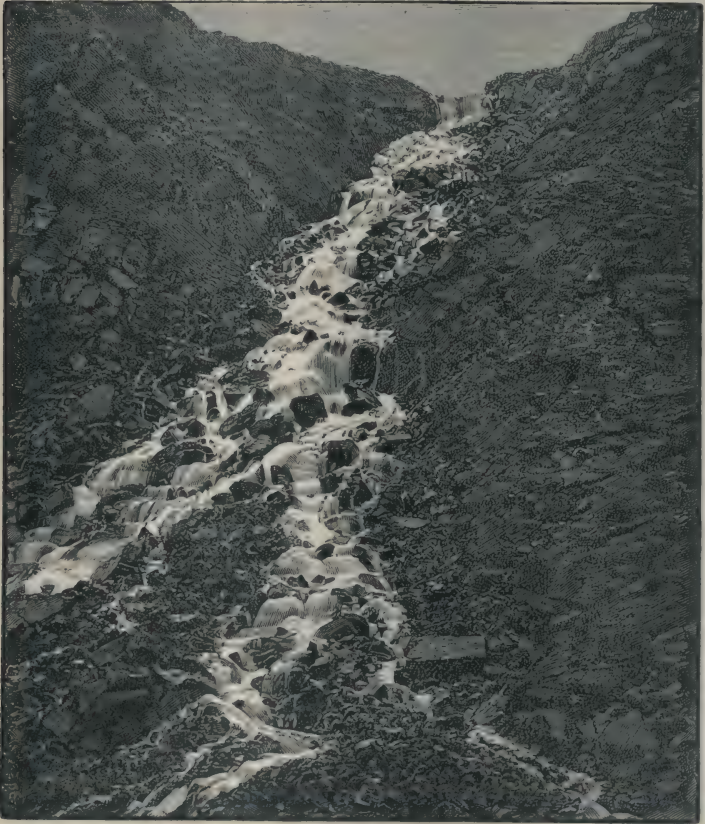
The only comparatively level part of the country was that in the immediate neighborhood of the house. The building was conveniently and pleasantly situated within thirty yards of the water's edge on a small tableland between two brooks, which for a few months in the year ran into the sea.

To the southward, along the steep shore to Dutch Island, which was about two miles distant, and at the very entrance of the harbor, rose up abruptly a high hill, whose elevation was over fifteen hundred feet. It was called Cairn Hill from the cairn established by the English.

To the eastward a comparatively low valley stretched, separating Cairn Hill from Mount Cartmel, which, some two thousand feet high, was to the northwestward of the station. The valley separating Mount Cartmel and Cairn Hill led up to a gentle divide, through which Water-course Creek and the coal mine, some four miles distant, were reached, over a country which, though affording the best travel of the neighborhood, was an exceedingly rough one.

Directly to the northward was a sharp break in the high cliffs, which was known as the north valley. Through that opening rose to view, some five miles distant from the sea, an elevation of nearly three thousand feet, the Hogback. It received its name from the gently curving outlines of its summit, the common form of most hill-tops in Grinnell Land; many of which will be mentioned later under that generic name.

To the northwest, about a mile distant, emptied into the sea a creek from Cascade Ravine. This ravine was so named from its series of beautiful cascades, where the summer torrents



An Arctic Brook.

plunged downward in the distance of a mile over fourteen hundred feet through a bare cleft in the solid rock. This creek drained the upper plateau around the Sugar Loaf, a pointed elevation of eighteen hundred feet.

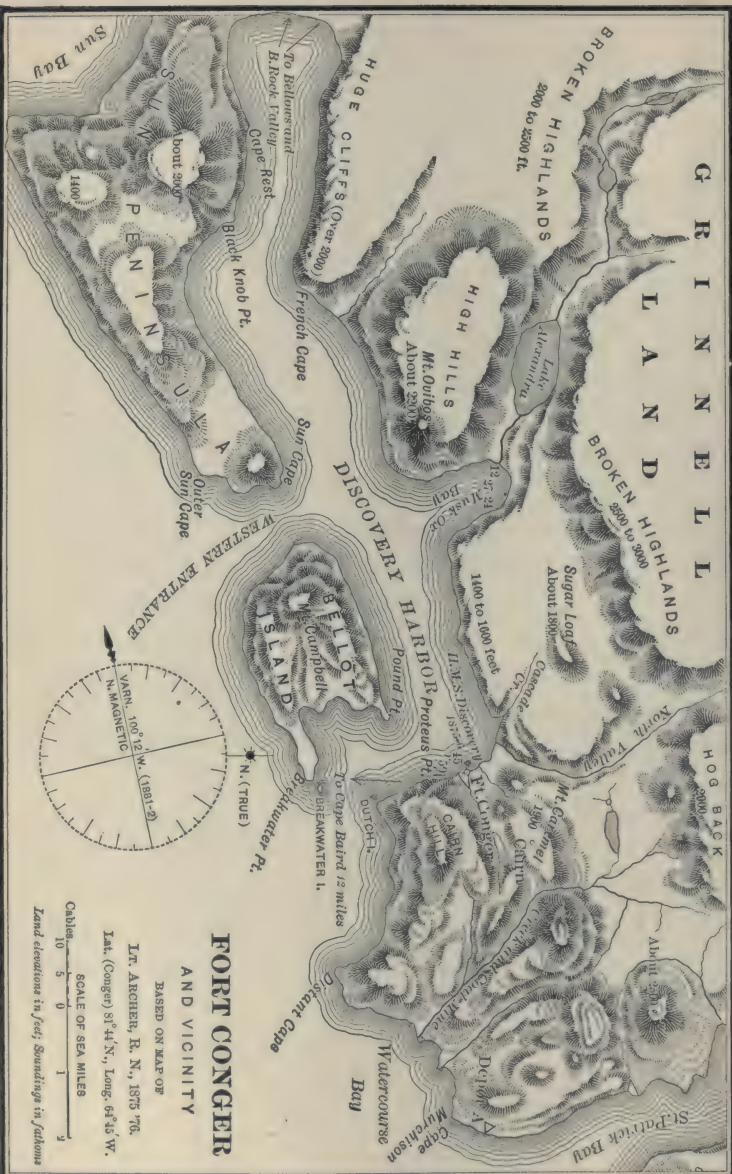
From Cascade Ravine westward to French Cape, for a distance of ten miles, cliffs from fourteen hundred to two thousand feet rose so nearly perpendicular from the harbor that they were inaccessible, except possibly at one or two places. About five miles west of the station these cliffs turn sharply to the northward, making a large indentation, which is known as Musk-ox Bay, into which drained, through a break in the cliffs, a series of fresh-water lakes, the largest of which was named by the English expedition Alexandra, after the Princess of Wales. On the western entrance of Musk-ox Bay Mount Oribos raises its snow-capped head over two thousand feet.

To the southwest of the station Bellot Island, about three miles long by two wide, separates Discovery Harbor from Archer Fiord, leaving to the westward a broad channel between itself and Sun Peninsula. The island is a beautiful one, rugged and high, with its summit (Mount Campbell) of about twenty-one hundred feet attractively marked with eternal drifts of snow.

It is thus seen that our immediate surroundings were on nature's grandest scale. So perfect was the harmony, and so proportionate the parts, that the grandeur at first, as of Niagara, was hardly appreciated.

The great harbor, with its twenty square miles of immense ice-floes, hemmed in at every point by precipitous walls, which ranged from hundreds to thousands of feet in height, seemed at landing but a small bay surrounded by moderate hills.

But at times our thoughts and eyes turned homeward, and from the station far to the southward the bold capes of Morton and Tyson stood forth on clear days, grim sentinels that overlook the eternal ice-stream which pushes downward from the interior of Greenland into Petermann Fiord.



GREENLAND

BROKEN HIGHLANDS

BROKEN HIGHLANDS

2000 to 2500 ft.

HIGH HILLS

Mt. Orvig
About 2300

HUGE CLIFFS (Over 2000)

French Cape

To Bellows and
Black Knoll Cape Rest

Black Knob Pt.

about 2000

PENINSULA

1400

Sun Bay

HOG BACK

Sugar Log
About 1800

1000 to 1600 feet

U.S.S. Thetis

1500

1500

1500

1500

1500

1500

1500

1500

1500

1500

1500

1500

1500

FORT CONGER

AND VICINITY

BASED ON MAP OF

Lt. ARCHER, R. N., 1875 '76.

Lat. (Conger) 81° 44' N., Long. 64° 45' W.

SCALE OF SEA MILES

Cables 10 5 0 1 2

Land elevations in feet, Soundings in fathoms

CHAPTER VI.

AUTUMN SLEDGING.

THE house was scarcely completed before field-work commenced. The difficulties and dangers of such work in autumn are obvious, and have been dwelt on to a marked extent by most Arctic writers. The snow gone from the ground renders land travel by sledges impossible, while along the edge of the sea the ice-foot is similarly impracticable. The sea itself, especially in very high latitudes, is always more or less full of ice, which if not dangerous soon becomes so through being cemented together by young ice, an obstacle the most difficult of all for a boat to pass through.

The sun shines but little and feebly; the nights—the bugbear of all Arctic travellers who have endured them—lengthen with fearful rapidity; the moist, penetrating air readily chills and stupefies, while the cold steadily increases with the growing autumn. The young ice, formed rapidly by low temperatures, is a thick, leathery substance, the surface of which is covered an inch or more with a moist, saline efflorescence, beautiful to the eye, but which binds and impedes the passage of a sledge much the same as wet sand checks the movement of an engine on the rails. This substance congealing only at very low temperatures, melts and saturates the foot-gear of the travellers. In addition, a light coating of snow frequently conceals thin, young ice when the serious danger of its breaking under the sledge, and the consequent immersion of the whole party is

encountered. In autumn temperatures the travelling-gear of a man once wet, the chances of dangerous frost-bites and disaster largely increase. It is sound doctrine that autumn sledging should be carefully planned, attempted with great caution, and never pushed to great distances.

On August 29th Lieutenant Lockwood was sent, with two men on foot and with packs, to ascertain the practicability of inland travel to and around St. Patrick Bay. He was gone but two days, during which time he was fortunate enough to kill a musk-ox, and unfortunate enough to freeze one of his feet. The temperature at that time was about 25° (-3.9° C.), but travelling through occasional pools dampened his foot-gear and frosted his foot without his knowledge. St. Patrick Bay was found to be fringed with precipitous cliffs of nearly a thousand feet in elevation, which were broken only by a narrow valley at the very head of the bay itself. Occasionally a narrow ravine worn by the summer streams was found, up or down which an unencumbered traveller could pass with great difficulty.

This result was somewhat of a disappointment to me, as I had at that time a small depot of provisions on a wheeled conveyance, which were to be cached for travelling parties at the most practicable crossing. These articles were left at the head of the bay, and later in the month were removed to Cape Murchison, where they formed Depot "A."

In the early days of October Lieutenant Lockwood made a second journey in the same direction, and spent a few days in exploring the valley which extends northward from the head of St. Patrick Bay. A mile and a half wide at its entrance, it reached some six miles to the northwest, where the lower level of the valley terminated, but a narrow ravine enclosing a river-bed still continued several miles farther toward the north. The valley through its whole extent was hemmed in by precipitous

bluffs of great elevation, rarely broken by steep, narrow ravines on either side. To the left a narrow gorge broke into the valley, which subsequent explorations two years later showed conclusively to be the main valley, through which drains the greater part of the water which flows into St. Patrick Bay.

Of the valley proper Lieutenant Lockwood says: "It has two levels, that of the stream, and a second of level mesa-lands from fifty to a hundred feet above the general level. These mesa-levels seem to be washings from the lofty sides of the valley, and project first on one side and then on the other, like the mud flats of a river. A narrow gorge, the river-bed, illustrates glacial action at some past period, the rocky sides being deeply worn and grooved."

In connection with subsequent similar discoveries, I entertain no doubt that within a reasonably remote period this valley was below the level of the sea, and the glacial ice-cap now withdrawn far from the sea discharged by an offshoot into St. Patrick Bay, and during the gradual retreat of the ice alternate beaches naturally formed from deposits of the muddy stream, as in many other rivers.

On August 30th I sent the surgeon, Dr. Octave Pavy, and Sergeant Rice, the photographer of the expedition, on an overland trip northward. Their instructions required them to proceed as far as practicable toward Cape Joseph Henry, searching carefully on the way for traces of the missing steamer Jeannette. In addition, they were to examine the condition of the English depot at Lincoln Bay, and report on the practicability of autumn and spring travelling by sledge along the Grinnell Land coast to the northward. They travelled with packs, carrying a dog-tent, blankets, and sufficient provisions to last them as far as the English depot, where their supplies could be renewed. They struck across the country from Conger nearly in a straight line

to the head of St. Patrick Bay, and thence by a direct course to Mount Beaufort, near Cape Beechy, where they saw numerous traces of musk-cattle and foxes.

Their route from Shift-rudder Bay to Wrangel Bay was through inland valleys, which were separated at their head by a narrow water-shed of some fifteen hundred feet in elevation. In these valleys were found a number of small lakes, in one of which Sergeant Rice saw a small fish some six or eight inches long. The depot at Lincoln Bay was missed in going northward.

On September 3d Cape Union was reached, where, at an elevation of one thousand feet, Dr. Pavy found "an horizon as clear as can be possible to find." In Robeson Channel the ice was packed closely to the Greenland coast, while to the north the sea was covered with level ice, broken in occasional places by water-spaces. On the Grinnell Land side a broad channel of open water, two miles wide at Cape Union, stretched as far northward as eye could reach.

Returning southward, Lincoln Bay was reached, and the depot discovered in generally bad order. The packages were strewn around in disorder, and apparently several which could not be found had been blown over the high cliffs by a violent wind. Nearly a thousand rations of Australian beef, curry paste, onion powder, and matches were in perfect condition, as also six hundred rations of stearine. A defective bung had caused the loss of all but a few gallons of the rum. A small quantity of tobacco, chocolate, and sugar were good, the rest having become mouldy; the tea, sugar, and salt had suffered from dampness, while the potatoes and bread were spoiled by mould.

Water-tight cases of very light tin should be used in protecting stores thus cached. Particular attention should be given to the tightness of bungs, and to securing casks containing liquids

so that none can be lost. Of five depots examined by my expedition, there was no case where there was not a portion, and generally a very large portion, of the rum and alcohol lost by lack of proper attention in this respect.

Such of the small stores as were serviceable were repacked in one cask, and all of these supplies were of great benefit the succeeding spring, when a party was sent northward over the Polar Sea. At Lincoln Bay a hare was killed by Sergeant Rice, and Dr. Pavy found at the head of the bay coal similar to that of the mine in Water-course Ravine.

Sergeant Rice, who had broken through the young ice and saturated his foot-gear on his way north, was disabled while at Lincoln Bay by an attack of acute rheumatism. His sufferings were intense, and every step caused agonizing pain in his feet, but his indomitable pluck and great enduring powers enabled him, with the judicious aid of Dr. Pavy, to proceed slowly homeward. Arriving at the valley near the head of St. Patrick Bay, he was unable to go farther. Light snow had fallen during the march, and the temperature had fallen to 17° (-8.3° C.). The doctor then erected the tent, and, making him as comfortable as possible, returned to the station for assistance, reaching Conger at 4 A.M. of September 9th.

I immediately sent Sergeant Brainard, with hot coffee and food, a bottle of Sauterne wine, and the needful medicines, to make him comfortable pending relief; three hours later a party of four followed, with sled and an improvised stretcher. The sled could be taken only as far as the top of the precipitous cliffs overlooking St. Patrick Bay, and it was necessary to transport him several miles to reach that point. Later six additional men were sent, as the original party were unable to bring him up the steep cliffs, and with them a buffalo-robe to make a warm and more comfortable stretcher.

While awaiting additional assistance, the first party carefully examined the cliffs for several miles for some ravine of gentle slope, but none could be seen. In the search, however, Private Connell and Frederik found a large coniferous tree on the beach just above extreme high water-mark. It was about thirty inches in circumference, some thirty feet long, and had apparently been carried to that point by a current within a couple of years. A portion of it was cut up for firewood, and for the first time in that valley a bright, cheery camp-fire gave comfort to man. Eventually the party reached Conger shortly after midnight; none too soon, as the temperature had fallen to 8° (-13.3° C.), and a northerly storm followed a few hours later.

Sergeant Rice recovered rapidly, and ten days later was in the field. While suffering from this attack he had travelled fifty-five hours in three days, and when relieved could scarcely move a limb; his suffering was so great during this trip that he lost twenty-four pounds in weight.

It is unnecessary to say that no traces of the Jeannette were found, as that unfortunate ship had sunk three months before. On the very day of Dr. Pavy's return, the gallant De Long was camped on the opposite side of the Arctic Circle on one of the new Siberian Islands, with only a week's provisions, but courageously hoping, "with God's aid, to reach the settlements on the Lena River."

During Dr. Pavy's absence the fortunate opening of the straits had enabled me to establish a large supply-depot near Cape Beechy. On August 30th Robeson Channel had cleared wonderfully of ice, and I decided immediately on sending a boat-party northward. Unfortunately our steam-launch was cut off by heavy ice from the open water, and the use of the whale-boat was necessary.

Sergeant Brainard, my orderly and commissary-sergeant, was

selected for this important work, in consequence of Lieutenant Lockwood's temporary disability from a superficial frost-bite.

Nearly two thousand pounds of provisions, fuel, bedding, and other necessary field-supplies were transported to the whale-boat over the harbor-floe, not without difficulty and danger, owing to the rotten condition of the young ice.

Jewell, Cross, Salor, and Connell were detailed as the crew. They left on the morning of the 31st, and moved northward under great difficulty, consequent on the violent currents in the vicinity of Distant Cape, which frequently threatened to injure the boat through the small floes, and later drove them for a short time to the shore at Cape Murchison for safety. The falling temperature caused new ice to form rapidly in St. Patrick Bay, and it was crossed only with great difficulty.

They succeeded in reaching Cape Beechy on September 1st, but grounded floebergs, with the great height and crowded condition of the ice-foot, rendered a landing at the cape impossible; and, owing to the threatening appearance of the pack, Sergeant Brainard gave way a short distance to the southward. They landed the stores and hauled up the boat through a break in the ice-foot about two miles from the cape, near the base of Mount Beaufort.

A northwest gale setting in filled Robeson Channel with heavy ice from the Polar Ocean, and precluded any immediate chance of returning by boat. In consequence they securely cached the boat, pitched the tent, in which the provisions were stored, and returned overland to Fort Conger, which was reached on the 3d. During their absence the new ice in St. Patrick Bay had increased with such rapidity that it was sufficiently strong to admit of their crossing it. Private Connell killed a fiord-seal at Cape Murchison, which was secured and cached under the boat. Although the temperature only fell to 19.5°

(-7° C.), yet the strong winds with moist air caused the party to suffer much more from cold than they did the following spring when exposed to temperatures in dry calm air much below zero (-18° C.). Sergeant Brainard developed in this trip the qualities of prudence, energy, and sound judgment which ever characterized his service with the expedition.

Sergeant Gardiner and Corporal Salor, a few days later, examined the foot-hills of St. Patrick Bay, to see how far westward from Cape Murchison they would be practicable for loaded sledges. In connection with Sergeant Gardiner's report, which showed the impracticability of loaded sledges following the coast for more than a mile beyond Cape Murchison, I decided to establish a depot at the point where a party travelling northward would leave the coast, and so removed, through Sergeant Lynn and party, a small depot previously located at the head of the bay. The depot thus established near Cape Murchison was known as Depot "A."

During these trips Sergeant Gardiner found on the shore of St. Patrick Bay an eight-man sledge, pickaxe, cooking-lamp, and a twelve-foot cedar boat with paddles. These articles needed only slight repairs to make them immediately and thoroughly serviceable. They had evidently been abandoned by sledging parties from H. M. S. Discovery in 1876.

Sergeant Lynn found on the shore of Water-course Bay a cart, evidently abandoned by the same expedition. Later, these articles, except the boat which was used elsewhere, were all brought to the station, and proved of service to us. The cart, however, was of too heavy a pattern to be of much practical benefit.

This cart, or a part of it, was used by Lieutenant Lewis A. Beaumont, R.N., in his attempt to reach Robeson Channel from Discovery winter-quarters (site of Fort Conger), in

October, 1875. The experiences of that great Arctic traveller, Sir Edward Parry, were sufficiently fortunate to justify the opinion that for overland travel a sledge may well be replaced by a cart. Lieutenant Beaumont in attempting to carry out his opinion, sustained by so sound an authority, was unfortunate in having so heavy a vehicle. I thoroughly concur with him in the opinion that overland travelling, in Grinnell Land at least, can be better done by cart than sledge, and that I so held in 1881 contributed in a marked degree to my successful journey into the interior of that country in the summer of 1882.

On September 7th, the harbor-floe being fit for sledge travel, I decided to visit the entrance to the Bellows, a valley which was situated some fifteen miles southwest of the station at the extreme point of Discovery Harbor, which I temporarily named Basil Norris Bay. The Bellows Valley received its name from the officers of the English expedition of 1875, on account of the high and constant winds which were always experienced in it. It is separated from Black Rock Vale to the westward by a high, peculiarly shaped bluff called Bifurcation Cape. I was accompanied by Lieutenant Kislingbury, and Sergeants Brainard and Ralston, with Eskimo Jens as a dog-driver.

Excellent ice for the sledge was fallen in with, and the trip was made in about three hours, notwithstanding some delay in the centre of Basil Norris Bay, on our discovery of ten eider-ducks in a water-space surrounding a palæocrystic floe. They were evidently two females, with their full-grown broods, which, incautiously delaying their migration to the southward, the sudden advent of winter had caught and detained. The young ones were killed with pikestaff, but the older ones flew away some distance after being driven from the water, and were killed by Lieutenant Kislingbury with his rifle.

On nearing the shore Sergeant Ralston discovered a herd of

fourteen musk-cattle, which were quietly grazing on a low plateau near the entrance to Black Rock Valley, some three miles distant. The party were armed only with one rifle and revolver, so Lieutenant Kislingbury and the sergeants were sent to surround the herd, of which I ordered that eight only should be slaughtered. It seemed then to me, as now, that unless there was immediate necessity for the meat, this interesting species should not be exterminated by indiscriminate slaughter.

The musk-cattle thus killed, with those already obtained in the vicinity of Conger, afforded us a liberal and satisfying diet of fresh meat until the ensuing summer. While the hunters were securing the game, I sent Jens with the sledge to the place selected for the temporary camp, and proceeded myself to Sun Bay, in order to find and examine the depot cached near Stony Cape by Lieutenant Conybeare in 1876.

On my way across the low divide which separated the two bays, I was fortunate enough to find two musk-oxen, and by taking advantage of the ground succeeded in approaching within forty yards of them without attracting their attention. For a quarter of an hour I was able to examine these rare and peculiar animals, who did not notice my presence for a considerable time, and when they did so were not alarmed, as I remained perfectly quiet.

The circumstances were such as afforded me an excellent opportunity of observing the manner in which these animals obtain their food in winter, as they were feeding while the ground was covered with snow sufficiently deep to conceal the scanty vegetation of the valley. Moving from one patch of *Dryas* or *Saxifraga* to another, the animal with its hoof scraped away carefully the snow from the plants, and later supplemented this action by the farther use of horns or proboscis as

circumstances required or convenience dictated. In no case did either animal fail to first remove the bulk of the snow with its hoof.

Their food at that time was almost entirely *Dryas octopetala* and *Saxifraga oppositifolia*; the grasses and lichens were almost entirely lacking, and in no case did I ever note the musk-ox feeding on the latter vegetation, although in many places near Conger the ground was covered with scanty, minute lichens for acres in extent. The animals, although active, agile climbers, displayed on this and other occasions, when feeding, an awkwardness of gait and movement which was particularly striking.

A long and tedious search for the depot had but scanty results. In a thorough search over acres of pointed rocks overlain by a thin covering of snow, I found nothing but two six-quart cans full of rum and alcohol. I was finally forced to the conclusion that the provisions must have been cached in bags, and eaten by wild animals, as the remains of bags were found near the alcohol cans, and the lair of a wolf was situated near by.

While hunting for the depot I unfortunately fell in a mass of loose, pointed rocks, and seriously injured my right knee. During the search I went along the new ice which had formed in Sun Bay to within one hundred and fifty yards of Stony Cape. The ice thence southward of Archer Fiord was entirely new, and in perfect condition for travelling.

On returning to the party I learned that nine musk-oxen had been killed. Camp was moved to the foot of the steep cliffs where the cattle had been killed, in order that the process of skinning and dressing might be the easier accomplished. Early the following morning Lieutenant Kislingbury killed another musk-ox, which had been wounded the night before.

The morning proved snowy and stormy, with low temperature, 15° F. or -9.4° C. I decided in consequence to return to the

station with as much of the meat as could be sledded to the harbor-ice over the partially snow-covered ground. We were three hours in reaching the ice, although the distance was only two miles and our load but six hundred pounds. By that time we were exhausted by our labors, and the steel runners were worn through by rocks protruding from the snow.

At the water's edge a large number of pieces of drift-wood were found near or slightly above the high-water mark. Some of the pieces were six or seven feet long, and from four to eight inches in diameter. Nearly all were coniferous woods.

We cached a portion of our provisions for the use of future parties, and struck out across the harbor-floe, which we were able to reach over the ice-foot only with difficulty, owing to the high stage of the tide and consequent pools of water along the tidal crack.

On September 11th, Lieutenant Lockwood's frosted foot being well, accompanied by Christiansen and Sergeant Gardiner, he was sent with dog-sledge to explore the Bellows, and was to bring back as much of the musk-meat as could be hauled to the water's edge. He returned on the 13th, having gone about twelve miles beyond the point reached by Lieutenant Archer, R.N., and, like that officer, he saw in advance a narrow ravine, which was then thought to be a termination of the valley, but a year later it was found to extend somewhat farther.

From Bleak Cape, he says, the Bellows appears to be "A broad valley, probably two or three miles wide and quite level, walled in by high and steep cliffs and mountains. Its *apparent* termination is probably seventeen miles distant, and bears N. 34° W." From the *apparent* end the valley was followed some six miles, turning first north and then about northwest, and rapidly narrowing from a mile to a few hundred yards in width. "Through the gap at the end of the valley," says Lieu-

tenant Lockwood, "I could see one high peak covered with snow."

He had the same difficult experience with the sledge, while travelling up the valley, as had been encountered by our English predecessors. The level ground was but scantily covered with snow, and the sharp, flinty stones and hard substances which formed the bed of the valley rendered travelling exceedingly



Entrance to Bellows Valley, October, 1881.

[*Northeastern Side, near Bleak Cape.*]

difficult, and quite wore out the steel shoes of the runners. The last portion of his outward trip was necessarily made on foot. He found between Black Cape and Devil's Back a considerable quantity of lignite coal in small pieces, but was unable to discover the seam from which it came. It is evident that this coal was likewise seen by Lieutenant Archer, R.N., who "found the valley to consist of . . . shingle, . . . mixed with

some substance very much like charcoal." The coal in every way resembled that which came from the ravine near Water-course Bay.

One of the interesting results of this trip was the discovery of a large piece of knotty pine, three feet long and eight inches in diameter, frozen in the earth in the bed of the valley, two miles or more from Black Cape, at an elevation above the sea of nearly one hundred and fifty feet. Two musk-cattle were seen by Lieutenant Lockwood near the head of the valley, but, in accordance with his orders, they were not killed. Vegetation, though scanty in many places, was yet sufficient in the whole valley for large herds of musk-oxen.

▲ The highest point of the valley-bed above the sea was about six hundred feet. The temperature was low during the whole trip, sinking to 1° (-17.2° C.) on September 13th, and, with the constant wind, which gave the Bellows its name, made the trip a trying one.

On September 15th I concluded that the new ice in Archer Fiord must be sufficiently strong for travelling, and with its excellent condition as seen by me a few days before I hoped that a party could reach Beatrix Bay in a couple of days' travel, and thus make an attempt to cross the Grinnell Land coast to the westward, or at any rate establish, for the use of a future party, a cache at the farthest point reached. Dr. Pavy being very desirous of making the trip, he was sent with Private Whisler, Eskimo Jens, and two sledges. He returned the following day, with the information that the late storm had broken up the new ice in Archer Fiord, and that it had been impossible for him to pass around Rocky Cape. He cached his provisions on the shore of Sun Bay, and, visiting the slaughtered musk-cattle, brought to the station about five hundred pounds of meat.

September 16th, with Sergeant Brainard and Private Bend-

er, I started on a three days' inland journey toward the northwest, in the hope of learning something of the physical conditions of the interior of Grinnell Land. My knee, injured the week before, was not sufficiently recovered to enable me to make the journey, and I was obliged to send in my place Private Connell who had accompanied us a few miles. The party succeeded in penetrating some twenty-five miles to the northwest, where they reached a high "divide," from which they had reason to believe water drained to the westward. A heavy snow-storm springing up prevented any views to the westward, and obliged them to return to the station. This journey was made on foot, the sleeping-bag, food, and cooking apparatus being carried in packs.

Although the ice of Discovery Harbor, composed of old floes cemented by young ice, was practicable for sledging early in September, it was not until the end of the month that the sea around Distant Cape was sufficiently frozen to be passable for sledges. The heavy tides and strong currents which prevailed off that point caused ice to form late in the autumn, and to break up at an equally early date in the spring. This proved unfortunate for us, as I had hoped to obtain for use at the station an additional supply of coal from the mine in Water-course Ravine, which, difficult of access overland, could be reached by sledges over an easy route around Dutch Island and Distant Cape. On September 20th I examined the ice around that cape, and found that by crossing the extreme point overland, and by using the axe freely, a sledge could be got by the open water at the point of the Cape. The following day I sent Dr. Pavy and Jens with sledge and seven hundred pounds of provisions to be taken to Cape Murchison. He returned, unable to pass Distant Cape, but later in the day, with Sergeants Brainard and Rice, I got the sled around the Cape; a runner breaking in Watercourse

Bay, the supplies were not moved to the north side of St. Patrick Bay until the next day, by Sergeant Brainard.

Lieutenant Lockwood, with five men, started, September 24th, to add stores to Depot "B" (Cape Beechy). The eight-man sledge was used, and the party, hauling about one hundred and fifty pounds to the man, made the outward journey, some twenty-eight miles, in two days. Sergeant Rice followed them with a dog-sledge with additional supplies. Lieutenant Lockwood's trip resulted most satisfactorily, in adding important supplies to Depot "B," and in giving him valuable experience in sledging work. During the absence of the party the average temperature was -2° (-19° C.), and one observation was as low as -10.9° (-23.8° C.). Despite the severe spell of autumn cold, the work was done without disaster or material suffering.

Lieutenant Lockwood, in returning from Depot "B," brought from near the head of St. Patrick Bay a section of a large coniferous tree, probably pine. This section, from the centre, was nine and one-half inches in diameter. The tree as found was a smooth, perfect bole, unworked and but little worn by tidal action. It was in the same position, just above tide-water, as when first seen by Connell and Christiansen, September 9th.

Dr. Pavy believing sledge travelling practicable along the Grinnell Land coast, and expressing his confidence of reaching the vicinity of Cape Joseph Henry, I determined to send him again northward. On this occasion he was to be accompanied by Private Whisler, and use the two dog-teams of the expedition, driving one himself, while the other was to be under the skilful management of Eskimo Jens.

His orders required them to leave September 30th, but, much to Dr. Pavy's disappointment, I postponed his departure, not deeming it prudent to send a party into the field in the face of a driving snow-storm at a temperature of zero, Fahrenheit.

He left October 2d, with instructions to proceed to Cape Joseph Henry, searching *en route* for drift-wood or other traces of the Jeannette. In addition to this work, he was also directed to lay out along the Grinnell Land coast such depots of provisions as would facilitate spring travel in that direction. He took certain supplies from the home station, and was authorized to add the balance from Depot "B."

To the northward of Cape Beechy the party found a narrow, broken ice-foot, which was covered in many places by floebergs and heavy pack-ice forced up by the violence of late storms. Farther north the ice-foot was found to have been broken up by the sea in some places, and, becoming worse and worse, finally failed altogether, as it had not yet formed for the winter. It was consequently necessary to turn back at the southern termination of the Black Cliffs, to the south of Wrangel Bay. The ice to the eastward, in Robeson Channel, was reported by Dr. Pavy to consist of quantities of rubble cemented by new ice, and occasionally broken in by small lanes of water, the presence of which rendered a passage around Black Cliffs over the sea-ice utterly impossible. Dr. Pavy then returned to Depot "B," and attempted an inland passage to the westward of Mount Beaufort. He eventually found connecting valleys, which enabled him with difficulty, owing to the scanty amount of snow on the ground, to reach Wrangel Bay, by passing over the low "divide" which separated the valleys at an altitude of about seventeen hundred feet above the sea.

While crossing the "divide" into the bay, two ptarmigan were seen, one of which Eskimo Jens killed with his revolver. Although these birds are without doubt permanent habitants of Grinnell Land, and traces were seen later in the season, yet but one other covey of them was seen until spring. The natural coloring, which has been vouchsafed in such a remark-

able degree to the rock-ptarmigan, renders it nearly impossible to see them, except by acute observation and in very close proximity.

Dr. Pavy pushed northward through Wrangel Bay, finding the narrow ice-foot of the same broken and difficult character as that below. He eventually reached with his man a point near Mount Parry, where he cached a hundred and fifty pounds of pemmican and fifty pounds of bread. Lack of ice-foot farther and the open condition of the floe-ice in Robeson Channel prevented advance beyond that place. They were obliged to spend one night on an insecure ice-foot but a few yards in width, in constant danger on one side by falling stones from the high, precipitous cliffs, and on the other from the effect of the heavy gale, which, forcing huge palæocrystic floebergs against the unsheltered ice-foot, was liable at any moment to topple large overhanging ice-blocks upon the camping party.

Some alarm, which turned into amusement, arose from Whisler being attacked by "nightmare," which caused him to believe that the ice-foot, with tent, was being carried into the straits, and to rush with fright from his sleeping-bag and the tent, awakening and alarming his comrades.

Dr. Pavy reached Conger October 9th, convinced, from his experiences, that travelling northward along the Grinnell Land coast was rarely practicable in autumn.

Having made autumn trips and explorations in all other quarters, our attention was turned toward Cape Lieber, with the intention later of exploring the interior of Judge Daly Peninsula. Near the end of September Sergeants Brainard and Jewell made an attempt to reach Cape Baird, which proved unsuccessful, owing to the unsafe condition of the ice in Lady Franklin Bay. The character of the ice in that direction was exceedingly rough. It was evident that the old floe had not



MUSK-OX KILLED NEAR FORT CONGER.

(From a photograph.)

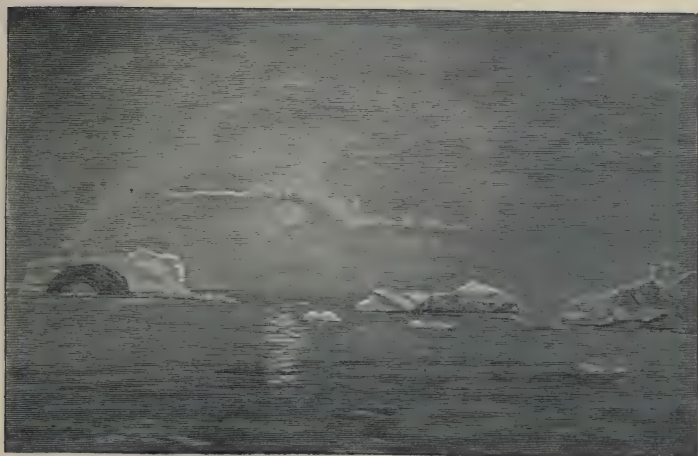
been firmly united by young ice, but was yet liable to separate during heavy tides or strong winds.

Lieutenant Lockwood tried the ice again unsuccessfully October 7th, but, finding conditions more favorable on October 10th, established a small depot near Cape Baird for hunting or exploring parties. Sergeants Brainard and Rice were at the same time engaged in obtaining photographs of the country adjoining the Bellows, and in bringing in the musk-cattle killed and cached near the entrance to that valley.

Autumn went and winter came with the departure, for four and a half months, of the sun. The beginning of the long Arctic night found the party in excellent health and spirits, and with firm faith and confidence in their ability to meet the hardships of the next season, and to improve in the coming spring on the quantity and quality of their sledging work.

Our autumn labors, as regarded the Grinnell Land coast, had been successful beyond my anticipations. Four depots had been established to the northward, the condition of the stores at Lincoln Bay ascertained, points previously unknown reached toward the interior, over three tons of fresh meat obtained by the hunt, and much valuable and practical information gained as to the physical character of the country, and as to other conditions bearing on field-work in that region.

In acquiring a practical knowledge of sledging in such high latitudes, and under trying conditions common to all autumn work, it was gratifying that no accident or disaster had occurred. Not the least benefit resulting from this experience was the development of minor, but none the less important, defects in our sledging-gear and the manner in which the work was conducted. Nowhere more than in Arctic sledging do widely varying and quickly changing conditions demand greater shifts and expedients to insure moderate or complete success.



CHAPTER VII.

SUNLIGHT TO DARKNESS.

OUR life at the station during this time was by no means devoid of interest. The completion of the house, the placing of our scientific instruments, the construction of meteorological, astronomical, and magnetic observatories had kept our carpenter force busy for many weeks, and until the middle of September no one had scarce a breathing spell.

The birds had generally disappeared before the Proteus departed, and such game as was in our immediate neighborhood had been secured. Twenty-six musk-oxen, ten ducks, a hare, two seal, and a ptarmigan rewarded our hunter's efforts during September and October, which afforded about six thousand pounds of fresh meat for the party, and nearly an equal amount of offal for our dogs.

Lieutenant Kislingbury hunted assiduously in the immediate

neighborhood from the end of August, but no game was to be found. The only visible life noted by him at that time were spiders, mosquitoes, flies, caterpillars, moths, and "daddy long-legs" on the hills, and a few chubs and minnow in Lake Alexandra. The mosquitoes, numerous and troublesome at the Greenland ports, were fortunately few.

The severe temperatures in August (as low as 15.6° or -9.1° C. was noted) covered the sea with ice, dried up our running brooks, drove southward the migratory birds, and played sad havoc with the vegetation. The gay, yellow poppies were cut down, but other hardy flowers, purple and snowy saxifrages and the white daisy, flourished during the early days of September. The summer birds had gone the middle of August—an unusually early date, as Lieutenant Aldrich on September 10, 1875, saw a flock of turnstone on this coast nearly seventy miles to the northward. The fabled instinct of the feathery tribe to foretell a severe season was not needed to explain their departure, which resulted from the frost cutting off their supply of food.

I was somewhat surprised to learn, on September 3d, that the shallow ponds, to which the dried-up creeks drove us for water, were full of animalculæ of considerable size. The water was strained for a few days, but as otherwise inexplicable headaches and nausea occurred among some of the men, I had recourse for cooking- and drinking-water to ice obtained from the palæocrystic floes in the harbor.

The first signs of the coming polar night were noted on the evening of September 9th, when a grateful change to the eyes came, with a bright moon and the sight of a star of the first magnitude. While the mental irritation and depression consequent on the Arctic night are not experienced during the polar day, yet the latter has disadvantages. In some a marked ten-

dency to sleeplessness developed, and even the most methodical fell into irregular hours and habits, unless routine was imposed.

On September 10th a heavy northerly gale occurred, which, in conjunction with the position of the moon, caused an unusually high tide. Advantage was taken of these circumstances to cut the launch *Lady Greely* out of the ice, and haul her up inside of the ice-foot.

Much surprise and excitement was caused, September 13th, by the appearance of a large band of wolves upon the harbor-floe near the house. Their gaunt, slight forms showed up in a remarkable manner as the light fog, which at that time covered the country to the westward, magnified greatly their size, and some of them appeared to be as large as calves.

Thirteen to eighteen were counted in the pack. While they showed no signs of timidity, yet they were very careful to keep a proper and discreet distance, and none of our hunters were able to get within gun-shot. This caution, while in keeping with the general habits of the Arctic wolf, which has been rarely killed by hunters, seems surprising, when we reflect that these animals could never have been hunted, and doubtless had never seen anything but a bear which could injure them.

The tenacity with which Arctic animals hold to life was frequently instanced in our experiences, and it occurred to me whether it did not arise from the survival of the strongest and hardiest in a clime where nature ever seems at strife with nature's life.

September 26th a wolf came within a hundred yards of the house, and in the early twilight was for a time mistaken for one of the dogs. He was eventually pursued by Lieutenant Kislingbury and several men, and was shot through the body by that officer. The wolf, knocked down by the ball, lost at least a cupful of blood, and afterward continued to lose it steadily. He



GAME STAND AT CONGER, WITH BELLOT ISLAND IN BACKGROUND.

(From a photograph.)

was chased for some time without any one getting again within gun-shot. He was let alone for a time in the hope that he would die, and pursued by the hunters later, travelled on, leaving drops of blood on the snow, until he fell down dead, with his body substantially bloodless.

Disturbed by the proximity of such a pack, and fearing for the safety of our dogs, which showed terror and dismay at the approach of the wolves, I decided to destroy them by poison. They showed, with the foxes, much craft and caution in approaching the poisoned meat, and would touch none, though several poisons were tried, until good was mixed with the poisonous meat. Even then they avoided it at times. Lieutenant Kislingbury reported that on one occasion the meat was visited by foxes, who ate all the good meat and left untouched that which contained poison. Eventually four wolves and a fox were poisoned, and the rest disappeared for that season at least.

Lamps were first lighted for general use on September 16th, and the next day our bath-room, a warm, well-arranged place, was completed.

The first birthday at Conger occurred on September 17th, that of Private Whisler, who completed his twenty-fourth year. The occasion was taken to inaugurate a practice, which was invariably followed during our service at Conger, of exempting the man from duty and of allowing him to select the dinner from our entire list of dainties and provisions. In addition, a quart of rum was given him for such disposition as he thought fit to make of it. The equitable disposition of it by Whisler among the party established a precedent which was regularly followed.

The temperature fell below zero on the 20th, reaching -6.9° (-21.6° C.) during the day. This was probably the earliest

autumn date on which zero, Fahrenheit (-17.8° C.), had been recorded, the earliest approximate date being that of Parry at Melville Island, 1819, -1.1° (-18.3° C.), September 26th.

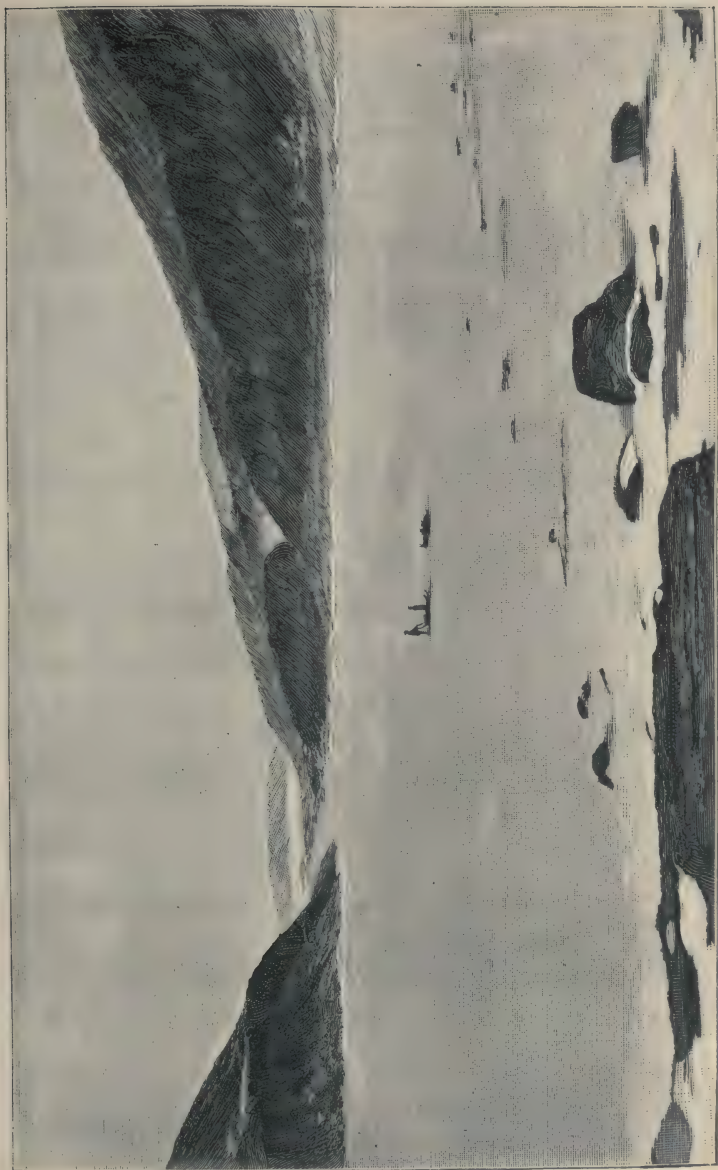
Occasional solar haloes were seen during the month, some of which were of very great beauty. That on the 21st was a brilliant display, which lasted for five hours.

Our first fire occurred on the 22d—a large hospital tent, pitched near the house and used as a carpenter's shop. Despite prompt efforts, the use of fire extinguishers, and plenty of water, the tent and its contents were a total loss. Fortunately we had duplicates of most of the tools elsewhere. I had made it a point to scatter and divide our stores, and, though an inconvenient arrangement at times, it afforded security against irreparable disaster from fire. Carelessness, as usual, caused the conflagration. Early in the month a fire-hole six feet square had been opened in the harbor-floe, so water was at hand. Later a fire organization was planned, and one or two false alarms made all familiar with their places and duties.

Although the straits were jammed with ice, yet considerable open water remained in the neighborhood of Distant Cape, and on September 28th Private Connell shot a fiord seal (*Phoca hispida*), which he was unable to obtain on account of the ice.

September closed with the entire party in excellent health. In addition to considerable meat eaten in the field, nearly four hundred pounds of birds and fresh musk-meat was consumed during the month. Our stoves proved unsuitable for the inferior quality of coal, and, worse than that, burned five tons of coal monthly, nearly double the proper amount.

The mean temperature for September was 10.92° (-11.71° C.), the lowest on record, except that of Kane at Van Rensselaer Harbor, 1854, which was 9.81° (-12.33° C.). The minimum,



LAKE ALEXANDRA, NEAR DISCOVERY HARBOR, LOOKING WEST.

(From a photograph.)

-11.9° (-24.4° C.), is the lowest on record as far as my knowledge goes. Through the effects of this remarkable cold the new harbor-floe increased during the month from four and three-eighths to fifteen inches in thickness.

The last few days of sunlight were filled in with hunting trips and short excursions in the neighborhood of the station. The fishermen then failed in Lake Alexandra as the hunters by land, but game and fish were to be had, for fish had been seen and glimpses of game obtained. Lieutenant Kislingbury saw seven ptarmigan (*Lagopus rupestris*) on October 2d, which had replaced their summer plumage of black and brown by a perfect coat of spotless white. These birds beyond doubt are winter habitants of Grinnell Land, but these were the last specimens seen that autumn. During the Arctic twilight they could be seen only by accident, for their plumage so resembles the color of new-fallen snow that only a keen eye can distinguish their outlines. A prowling wolf visited our meat-caches, and a cunning fox was seen near, only a few days before the sun left us for the winter.

Sergeants Brainard and Rice succeeded in reaching the summit of Mount Ovibos, but to do so they were obliged to make a long detour to the westward by way of Lake Alexandra. The lake was two hundred and sixty feet and the summit of Mount Ovibos twenty-two hundred and forty-four feet above the sea. Their labors were rewarded by the sight of a few snow-covered hogback mountains, far to the northwest.

The extremely rapid approach of darkness is a marked characteristic of all very high latitudes. It will be remembered that the first star at midnight was not seen by us until September 9th, and yet on October 8th the use of lamps became necessary within doors, except for an hour at midday.

Our last day of possible sunlight came—October 15th. All

had an uneasy, restless feeling while watching and waiting for the sun's appearance, the clouds in the south rendering it uncertain if we should be favored with its rays at the station. I visited high ground some distance to the northward for a better standpoint. Just after midday, my journal says, "A few rays breaking through the clouds gilded to the north the rounded, snowy summit of the Hogback (two thousand and nine hundred feet in elevation), while dense water-clouds, which rose from Kennedy Channel to serve as a beautiful background to the mountains of Daly Promontory, cut off all direct rays from lower ground. From time to time the brightly illumined clouds would drift slowly to the south, and as the delicate shades of pearly gray gave way to gorgeous coloring of mellow orange and fiery red, from moment to moment I hoped the curtain would roll back and the sun shine forth. Once for a few moments the red rays of refracted light lighted up the inner harbor and outer bay. This magic touch of color, blending with the snowy covering, gave a new glory to our Arctic scenery, which was further intensified and idealized by the rosy, curling columns of vapor rising in the dense, cold air from the few water-spaces." The reds faded into yellow, the pearly grays were rapidly replaced by the dull leaden hue, which told that sunshine had passed and the polar day had given way to the long reign of twilight and Arctic darkness.

CHAPTER VIII.

SLEDGING IN THE ARCTIC TWILIGHT.

THE disappearance of the sun by no means put an end to our sledging work. After that time various parties were employed in mining coal in Water-course Ravine, and in hauling a portion of it to Depot "A," at Cape Murchison, where some three thousand pounds were accumulated to serve as fuel for sledge parties who might pass the night at that depot. A small quantity was also hauled to the home station.

After consultation with my officers, I decided that the inaction and monotony of our long winter should be postponed as far as possible by the continuance of sledging work after the sun had left us and the Arctic winter commenced. The dangers and privations of this work were undoubtedly great, and such action was contrary to precedent. In these matters elaborate and practical suggestions from our predecessors are not to be lightly disdained or neglected, but it is equally certain that individuals suited by temperament and character for Arctic work, after a certain amount of experience, must not follow too blindly precedent and theory. They should be able to gauge correctly the critical points of the situation, and the limit of endurance to which their men can safely be subjected. Such sound judgment and daring energy are essential before the best and most successful work can be done.

On October 23d, seven days after the departure of the sun, Lieutenant Lockwood, with Brainard, Connell, and Christiansen,

with a well-laden dog-sledge, left for Depot "B." Their mission was to construct a large, commodious snow-house, which was to be made thoroughly comfortable, and of sufficient capacity for any sledge-party which would visit it. It is certain that some of the articles selected for house-furnishing were striking, if not unique. My journal gravely sets forth that, in order to properly heat the snow-house, Lieutenant Lockwood was to take a few joints of stove-pipe, a small coal stove, and four hundred pounds of the best fuel which the country afforded—lignite coal from Watercourse Mine. It was surely not according to precedent, and seemed anomalous, if not absurd. But why not coal as well as oil, and a stove as well as a lamp, and so the coal went. It performed admirably then as ever afterward, and if at times the red-hot stove enlarged unduly the roof-flue, it was none the less a cheery, delightful sight and comfort to the storm-stayed traveller, and in no wise impaired the strength and stability of the structure.

While Lieutenant Lockwood and party were building the snow-house, Sergeant Gardiner and Private Ellis, with Jens, added a half-ton of coal, mined in Watercourse Ravine, to the supply at Depot "A" (Cape Murchison).

The changing conditions of the ice in Robeson Channel were strongly evidenced by Lieutenant Lockwood's observations during this journey, as compared with previous experiences that autumn. From the summit of Mount Beaufort, on October 26th, Robeson Channel was seen by him to be open in all directions; the only ice to be seen in any quarter was small and unimportant. No floebergs could be discerned, save a few grounded along the shore. It was his opinion, that at that time an Arctic vessel could have steamed, with but little if any trouble, direct from Cape Lieber to at least Repulse Harbor. Previously during September and October the channel had been

densely packed with ice. This journey having resulted favorably, I later decided on more important ones.

One great drawback in the autumn work had been our inability to cross Robeson Channel, in order to transport to the eastern shore caches of provisions for the use of the party which I intended to put in the field the next spring in order to determine the configuration of the most northern point of Greenland. It was also very desirable that we should ascertain the quantity and condition of the stores at Thank God Harbor, so as to know what articles and amounts could be drawn from that point for field use, or could be depended on in case a party was detained on that coast. The young ice in September had prevented any attempt to cross Hall Basin by boat, and although the weather had been unprecedentedly cold in October, yet the straits were in no ways fit at any time for an attempt at crossing by sledge. This was shown conclusively by Lieutenant Lockwood's observations on October 26th. In the days following his return the straits jammed with heavy ice, and the temperature remaining steady at about -7° F. (-21.7° C.), it seemed possible to Lieutenant Lockwood that a crossing to Greenland could be made near Cape Beechy, which, being at the narrowest part of Robeson Channel, is the point where the heavy floes drifting from the Polar Sea most readily jam, and, cemented by rapidly forming ice, afford a safe passage to the Greenland coast. I was thoroughly sensible of the extremely hazardous nature of such an attempt, but I consented to the experiment, having full confidence in Lieutenant Lockwood's prudence, and feeling thoroughly assured that his good judgment would cause him to abandon the effort, as specified by his written instructions, at such time as it might seem dangerous to proceed farther. Lieutenant Lockwood left November 2d, the temperature being -6.5° F. (-21.4° C.), with calm, clear weather. He was ac-



MAKING READY FOR A SLEDGE JOURNEY FROM FORT CONGER.

(From a photograph.)

accompanied by Brainard, Lynn, Biederbick, Saler, Connell, Ellis, and Frederick, all of whom had specially volunteered for the attempt. Fifteen days' rations, with complete camping-gear, were hauled on the eight-man English sledge.

This party was speedily followed by a second, which, composed of Dr. Pavy, Lieutenant Kislingbury, and Sergeant Rice, with both dog-sledges and Jens, left on November 4th to add stores to the depot in Wrangel Bay. The trip from Mount Beaufort to the south of Cape Beechy to Wrangel Bay was made inland, Dr. Pavy thinking that such route would facilitate his movements. The cliffs on the north side of Wrangel Bay were still washed by the open sea, showing that the storms of the previous month had broken up the sea-floe in many places. The quantity of stores which Dr. Pavy was able to add to the depot in Wrangel Bay was so small as to scarcely repay the hardships endured by his party, and the results of the trip emphasized the difficulty and fruitlessness of autumn sledging overland. Dr. Pavy's party reached the station on November 8th, having had no accident, or indeed sufferings, apart from the great hardships which are incidental to all winter sledging in such high latitudes.

The hardiness of the Eskimo dog was illustrated by an incident during this trip. One of the favorites, Gypsy, was in no fit condition to travel, but insisted on following the sledge, and the second day out gave birth to four puppies, which, left in a snow-bank near Cape Beechy until the return of the party, were brought safely to Conger.

Lieutenant Lockwood's party returned on the same day as Dr. Pavy, having been unsuccessful in their efforts to cross Robeson Channel, owing to the open condition of the straits. Judging on his arrival at Cape Beechy that the crossing by the sledge alone would be impracticable, Lieutenant Lockwood de-

cided to take with him the whale-boat, but was compelled to abandon that project as impracticable, as the boat was twenty-eight feet long and the sledge but eleven. In consequence he sent to St. Patrick Bay and brought up by sledge the small, cedar boat *Discovery*, and on November 5th made a second attempt.

The sky at that time was overcast, and the outlines of objects indistinct, in consequence of which the party experienced many falls in travelling through the snow and over the ice-floes. The party had proceeded but two or three miles into the straits, when they "heard very distinctly the groaning of the moving ice, like a distinct roar or the monotonous groan of a fly-wheel." Lieutenant Lockwood, seeing in the distance a dark line which seemed to indicate open water, moved in advance of the working party, and passed on to a level floe, which he soon found to be in motion. At this point the open condition of the straits, the increased darkness, and the doubtful prospects of success, wisely determined Lieutenant Lockwood to return to Depot "B." An examination of Robeson Channel on the subsequent morning showed a channel of open water of varying width, which was continually changing, according to the movements of the pack.

His return to the station occurred during the spring tides, which, forcing water through the tidal crack, had covered the ice-foot in many places. On several occasions the new ice which had formed over these pools was not sufficiently strong to bear the party, and at times they broke through it, wetting several to the knees. They were frequently obliged to travel on this dangerous ice-foot on account of the steep shore, which was impracticable owing to its occasional drifts and exposed rocks. In the middle of St. Patrick Bay, after the dry ice had been reached, the party was halted by Lieutenant Lockwood, and the greater part of the men changed their foot-gear.

On camping at Depot "A," near Cape Murchison, they found that Private Biederbick had frozen quite severely one of his toes, despite the changes of foot-gear during the day. As it gave him much pain, he was put into a sleeping-bag, and hauled on the sledge to the station. He was soon again fit for duty, as the frost-bite, though severe, was fortunately superficial. Sergeants Brainard, Lynn, and Connell suffered likewise from slight frost-bites, though none of them were serious.

Along such a bold coast no satisfactory sledging work can be done until the bitter cold of winter has bound fast into a secure and solid mass the sea-floes—the only true Arctic highway.

Our sledge trips that autumn stand perhaps unparalleled, considering our high latitude, as the sun had been twenty-three days absent when the last party returned to the station.

The results of these winter journeys satisfied me of the inadvisability of sending sledge parties to any considerable distance after the sun has left or before its return. The advantages derived are rarely commensurate with the energy expended. This does not apply to journeys entailing absence of one or two nights, where parties have a certain and comfortable shelter within reach.

The benefit which came from these journeys was largely moral, and resulted, in a great measure, from the fact that the monotony of our first winter commenced only in the middle of November, and not with the sun's departure a month earlier.

CHAPTER IX.

OUR FIRST DARK DAYS.

IT is the unknown which awes and terrifies, and so, gazing with a certain dread at the departing sun, the actual experiences of the first dark days came to us as a relief, and not as a hardship. For a time it then seemed that our brooding imaginations had played us false, and that an Arctic night, unbroken for nearly five months, was not so trying after all.

But, as the rapidly fading twilight gave place to darkness, and day after day brought only the gloomy sky and growing cold, we began to realize that it is not so much the conditions of cold and darkness in themselves, which render life in the high north so insupportable, as their eternal reiteration and continuing monotony.

That the long-continued darkness exercised a depressing influence on most of the party was evident to every observing person. Naturally no one was inclined to admit that he was personally affected, but no one escaped this influence. The most marked signs among us were tendency to insomnia, indisposition to exertion, irritability of temper, and other similar symptoms abnormal to our usual characteristics both mental and physical. In my own case, although following a set routine, it was only with difficulty that I could limit my sleeping-hours to a reasonable number, or apply myself steadily and successfully to continued mental work. While free from mental depression, insomnia, and feelings of lassitude which characterized

some, yet I was at times affected by irritability of temper, which it required a continued mental struggle to repress. But few were exempt from this symptom. Our faces gradually acquired a pale, yellowish-green color, which was disagreeable to view, and the extent of which was not clearly appreciated until the return of light.

The sun was last seen at the station October 14th, and again reappeared on February 28th, one hundred and thirty-seven days later. There has been much written about Arctic darkness, but the test usually given, that of text legible at noon, conveys to most persons an inadequate idea of its intensity. The sun, indeed, comes near the horizon at midday for a short time, and the effect is apt to be overrated. At Fort Conger stars were to be seen at local noon seven days after the sun had gone for the winter, and so remained visible in a cloudless sky for over four months. In all these days the southern horizon lightened up with more or less glow, the effects of which some have perhaps shown a great tendency to exaggerate, while others have shown an equal disposition to lessen. It is true, that on December 21st a twilight arch of several degrees existed in the latitude of Conger, but the practical benefit from such arch is disputable.* The darkness of midday at Conger was such, for nearly two months in midwinter, that the time could not be told from a watch held up with its face to the south. From this it will be readily understood, that in midwinter the light from the sun at noon is far less than that which is received from the full moon in middle latitudes.

* This statement is made with reference to astronomical twilight, which ends when the sun is 18° below the horizon. With reference to what is known as civil twilight, which ends at 6° below, no twilight existed at Conger during December. Apparently opposing statements as to Arctic twilight result from an indiscriminate use of these standards.

Regarding the Arctic night in general, the light is very slightly greater than that of clear nights in middle latitudes, and as the sky is unusually cloudless at Conger, very dark nights were uncommon. Whether it be, as I suspect, from the great freedom of the atmosphere from dust or not, the stars of one fainter magnitude could be seen at Conger than in lower latitudes. The "milky-way," on very bright nights, was so clear and distinct, that frequently on stepping outside the door it gave me the impression of a feeble auroral light, such as is commonly seen. The snow, too, seems to give out a certain amount of fine phosphorescent light. Whether it stores up the light received during the prevalence of the moon or not, and radiates it later, I cannot say.

The light from various sources was such in amount, that only on a few cloudy, stormy days were we ever prevented by darkness from taking our regular exercise. The departure of the sun and the coming of winter weather were nearly coincident. On October 8th the *mean* temperature sank below zero (-17.8° C.), there to remain continuously for six months and a day. For over five months, November to March inclusive, no *single* observation was noted higher than -3° (-19.4° C.). Our lowest October temperature, -31.1° (-35.1° C.), occurred on the 18th, three days after the sun left. The mean for that month was -9.22° (-22.9° C.), which has but twice been exceeded.

During the month of October the leisure hours of the men were occupied in banking up the house quite thoroughly. A wall of ice, six feet high, was constructed some three feet from the house, and was rendered wind-proof by a coating of wet snow. The space between the wall and house was later filled in with loose, dry snow, an excellent protection from its great non-conductivity to heat. The second year we improved on the arrangement of the first year, and carried the wall of ice

and snow up to the very eaves of the house, a work which added much to our winter's comfort.

October 25th, ten days after the sun had gone, we were much surprised by one of the party making the startling announcement that the sun was to be seen in the southern sky. It proved to be a beautiful mock-sun, which remained visible nearly an hour, its burning colors being watched with attentive interest as the reflected image that revealed the course of our lost luminary. It showed a brilliant disk of blue, yellow, and red, about four degrees above the horizon, with bars of white light extending from its centre upward and downward. I know of no other instance in which this phenomenon has been witnessed after the going of the winter sun.

Our photographer succeeded a few days later, despite the absence of direct sunlight, in making a fair negative, by exposing a sensitive dry plate for an hour, and was similarly successful seventeen days before the return of the sun.

The hunters continued in the field throughout all October, more for exercise than in any well-founded hopes of shooting anything. The existence of game was undoubted, for, during the last three days of the month, two wolves and a fox were seen, and a hare crossed the Dutch Island trail on freshly fallen snow within a mile of the house.

There exists a general impression that the nearer the geographical pole is reached the brighter and more frequent are auroral displays. The region most favored with such phenomena is a belt of country in North America, south of the magnetic pole, in about latitude 60° N., over a thousand miles to the southward of our station.

Some of our displays were grand and magnificent in the extreme, but in general they were lances of white light, having perhaps a faint tinge of golden or citron color, which appeared

as moving shafts or spears under the formation known as "merry dancers." The aurora of Grinnell Land is by no means comparable with those of glowing, burning colors, such as are to be seen in Hudson Bay country and Siberia, and some of which have been so vividly portrayed by Kennan in his "Tent Life in Siberia."

December 19th: "A particularly fine aurora, like a pillar of glowing fire, from horizon to horizon through the zenith, showing at times a decidedly rosy tint, and later a Nile-green color."

The monotony and unchanging character of Arctic life afford few chances of connected or interesting narrative, so I shall frequently quote freely from my journal, as giving the clearest idea of our life by showing how eagerly apparent trifles are touched and dwelt on.

Other than the departure of the sledge parties which left the station in the early days of November, the most important incidents were the births of the two litters of pups, five of which came on the 2d and five on the 3d of the month. My journal of November 4th says: "Two of the last litter and one of the first have died, and another was eaten by one of the pack. This evening the remaining pups of the last litter were for a time abandoned by their mother, who left them to quarrel with the mother of the other litter, which were in the same room with her. During the temporary absence of the mother, we placed one of her pups with the other litter, but it was pushed away by the indignant parent, who declined any addition to her cares. Finally the deserting mother returned to her puppies."

Another litter came a few days later, and one of the mothers, waiting her opportunity, seized one of the pups of the new litter and was about to devour it when discovered, too late to

save its life. It was found to be a common practice for the dogs to seize and devour young pups, but, although the bitches ate readily the litters of others, it never fell under our notice that a mother ever ate one of her own pups.

These dogs were placed in the care of Private Schneider, as our Eskimo were of the opinion that they could not survive. The experiences of our predecessors had shown the difficulty, if not impossibility, of raising litters born in the early winter. Our original teams, however, had been so thinned by dog-disease that I felt the importance of attempting to strengthen them, for at least the second winter, by raising these recruits. Nares also says pertinently, "An Eskimo is anything but a good nurse, and although Frederick is a valuable man in other ways, he cannot be induced to take sufficient care of the young dogs." My experiences were the same, and I selected for the work Private Schneider. He devoted much time and attention to them, and eventually succeeded in raising fifteen puppies, all of which were of great benefit to us in subsequent sledging operations. The disinclination of our puppies to open their eyes on the tenth day more than ever confirmed their keeper in the opinion that the Eskimo dog is an extraordinary animal. Those raised by Schneider were also broken to harness successfully, and driven by him the following summer.

"Our dogs would now never be recognized as the same wolfish, snapping, untamed animals obtained at the Greenland ports. Good care, plenty of food, and kind treatment had filled out their gaunt frames, put them in good working condition, and made them as good-natured, affectionate, and trustful as though they had never been pounded, half starved, and generally abused from their puppyhood upward." Half-starved animals, who have never been kindly spoken to, and who have been cruelly beaten on the slightest pretence, necessarily assume

in self-defence a threatening and vicious attitude toward all comers. They were regularly fed, first on alternate days, and then once daily, and we never found it necessary to maltreat and beat them to ensure fair behavior at feeding-time. Indeed feeding-time was the only occasion on which rival dogs would not fight, for long experience had taught them it was a losing game; whichever dog won, both invariably lost their food through neutral and wiser parties.

For a time amusement was afforded us by the discovery of a remarkable double echo, which gave back distinctly the seven syllables contained in the words "taking sea temperatures."

The excitement consequent on the return, November 8th, of the last sledging party for the winter, with Private Biederbick frost-bitten, had not died away, when two days later our second fire occurred. It was the carpenter's tent again, which had been pitched a sufficient distance from the house to ensure the safety of the latter. The fire was as usual the outcome of carelessness, resulting from an attempt to fill a gasoline-lamp without extinguishing it. Sergeant Elison, who was the careless man, paid dearly for his imprudence, as the flaming oil burned severely his hands and face, destroying his beard, eye-brows, and a part of his hair, fortunately without serious after-effects. The temperature was 32° below zero (-35.6° C.) at the time, but the fire organization was promptly on hand, and did good service with the extinguishers. No delay or confusion was experienced by the men in taking the places or performing the duties assigned them by the written instructions, and good order was marked. After the extinguishers were emptied, the remainder of the fire was smothered by blankets. The tent was not destroyed, and but few things of importance were damaged. Fortunately the party engaged in putting out the fire escaped any serious frost-bites, although the cold was intense.

In connection with the question of fire, I made it a point daily to examine the wood-work in the immediate vicinity of the chimneys, which were so arranged as to render the chance of a fire without immediate detection almost impossible. Such wood-work as was exposed to the heat from the chimneys was invariably left bare, so that its condition might be readily seen, which would not have been possible had it been covered by tin or sheet-iron.

Sergeant Brainard's journal of November 11th indicated the opinion of the men as to suitable clothing for ordinary use. He says: "Considerable attention is being given by the men to the manufacture of blanket-clothing; it is considered superior to the ordinary issue if stable-frocks and overalls (thin duck) are worn over to prevent snow from adhering to the rough, woolly surface."

The experiences of the expedition confirmed the opinion of Nares, Payer, Nordenskiöld, and many others, that for ordinary use, first-class woollen under-garments, with heavy, woollen clothing, are all that is essential in Arctic service.

The monotony of Arctic life commenced about that time. Different methods to alleviate its discomforts and depressions were broached, none of which were particularly successful, as, indeed, none can be. A tri-weekly school was commenced by me during the month, which was kept up through the entire winter with marked benefit to the men attending. In this work Lieutenant Lockwood relieved me by his cheerful and considerate assistance. Arithmetic, grammar, geography, and meteorology were taught. For a time Dr. Pavy instructed two men in French. The educational qualifications of the men were very good, and there was but one of the party on its original formation who was unable to write, and he acquired that attainment during our stay at Conger.

Lieutenant Lockwood, with the assistance of Sergeant Rice and Private Henry, edited a semi-monthly newspaper, the *Arctic Moon*. Its prospectus, issued on the 14th, excited curiosity and interest until it appeared on the 24th. It lived, however, only for two months, dying for lack of interest, although it served its temporary purpose of amusement and diversion.

It was not until November 14th that the temperature of freezing mercury (-38.3° C.) was noted, and the day following a number of oils and other substances were exposed in a temperature of -25° (-31.7° C.) for the purpose of noting the effect of low temperatures upon them. At a temperature of -30° (-34° C.), tincture of hyoseyamus and oil of peppermint were frozen solid. Coal-oil became of the consistency of syrup at -25° (-31.7° C.), and commenced to show signs of crystallization in places at -37.4° (-38.6° C.). New England rum, ninety per cent. proof, at -41.7° (-40.9° C.) showed a thin coating of slush, and at -47.4° (-44.1° C.) a small amount like syrup remained in the bottom of the vessel, the balance resembling mixed snow and water. At -49.7° (-45.4° C.) the vessel could be inverted without any liquor escaping.

November 17th, the temperature being at -30° (-34.4° C.), the construction of the pendulum piers, which has been elsewhere described, was commenced by us. It was a tedious and trying, though successful job of masonry. A few days later our little dog Gypsy, the brightest and most cunning dog of our teams, lost her last puppy through another mother springing at and killing it. Gypsy appeared to have maternal instincts to a marked degree, and sorrowed long for her lost litter. For a considerable time after this she improved every opportunity, in the absence of their own mothers, to suckle the young in other litters.

Although we were separated so far from our country, yet we could not fail to bear in mind the festivals which we knew

were being celebrated by our countrymen. November 24th was duly appointed in orders as a day of thanksgiving and praise. In the morning of that day, I read to the party, as appropriate for the occasion, the ninth selection of Psalms.

Later came a series of races and friendly contests for a few small prizes, which were offered by me to incite general participation. There was scarcely a member of the party who did not participate actively as judge, manager, or contestant.

The snow-shoe race of four hundred yards was won by Sergeant Brainard, pressed hard by Ralston and Gardiner. Later the Eskimo contested with teams of seven dogs each in a race to Dutch Island and return. The half-breed Frederik was first in, being, as the men said, too wily and cunning for the simple-hearted native Jens to contend with. A foot-race of one hundred yards resulted in a dead heat between three, which was eventually won by Ellis. In the afternoon rifle-shooting was tried at a distance of twenty-five yards; a candle set up in a box being the bull's eye. This was won by Private Henry, with Jens and Cross tied, which eventually resulted in the Eskimo winning.

At different times during the day a few auroral streamers of varying brightness shot up and vanished, as if to look on our unaccustomed sports. These mysterious and unearthly visitors from the far south had that day to me a weird and spectral aspect, which sadly belied their name of "merry dancers." The accompanying magnetic disturbances seriously interfered with the pleasure of our observer, who was obliged to quit the group of pleasure-seekers to watch for several hours in the cold magnetic observatory the vibrating needle which swung uneasily to and fro. The day passed quickly and pleasantly, and the unusual amount of out-of-doors exercise gave all a sharp appetite for the excellent meal which followed.

The dinner was the same for the men and officers, except that a small allowance of Sauterne from my private supply garnished the officers' table. Oyster-soup, salmon, ham, eider-ducks, devilled crab, lobster-salad, asparagus, green corn, several kinds of cake and pie, ice-cream, dates, figs, and nuts comprised the *menu*. In addition to a small quantity of punch at noon, a moderate amount of rum was given to the men in the evening, which contributed much to the merriment of the day.

On the 27th, at a temperature of -35° (-37.2° C.), Sergeant Cross froze his right ear while absent about two hours at exercise. This was the only occasion of any such accident during our regular winter exercise, and it probably resulted from a lack of care, although the physique of this man was such, from his habits and services, as to mark him as the individual of the party least calculated to endure hardships and exposure.

About five hundred pounds of musk-meat and birds comprised the fresh meat consumed during November; an allowance of about twelve ounces daily, which during December was increased to nearly a pound.

The decrease of coal burnt during November was over half a ton as against October; a marked gain when considering the greater cold of the latter month, which resulted from the change of stoves in the men's quarters and less work in the carpenter's tent. The December cold demanded more fuel, and the amount burned amounted to eight and a half tons.

The mean temperature for the month of November, -24.53° (-31.41° C.), is the lowest recorded by any Arctic expedition, being over two degrees colder than November, 1853, experienced by Kane at Van Rensselaer Harbor. The highest temperature of the month was 3° below zero (-19.4° C.), and the lowest 46° below (-43.3° C.).

The general health of the party during this time was ex-

cellent. Private Long, while in the cook-house, had paid such close attention to his duties that his health suffered somewhat, and necessitated his relief about the middle of October, but he soon regained his usual robust condition.

The next patient was the result of the only serious accident which occurred during the stay of the party at Conger. Sergeant Gardiner, on the last day of November, broke his left leg by falling in the pathway while making a tidal observation. The slope to the tide-gauge was a steep one, and in the dim light of his lantern and the rough condition of the ice he made a misstep, which resulted so unfortunately. Every attention was given to him, Steward Biederbick being particularly devoted in his duties as nurse. Sergeant Gardiner's general health remained good despite his enforced confinement for a couple of months, during which the bone united closely but slowly.

December opened with evidences that the winter solstice was approaching, for the twilight arch at noon was exceedingly fine, though it still afforded an extremely feeble light, which was sufficient to enable occasional journeys to be made to the summit of Bellot Island and to Cairn Hill, in order to read the meteorological instruments there exposed.

On December 5th a lunar eclipse occurred, which was first noted by Lieutenant Kislingbury and Sergeant Jewell. It had unfortunately escaped the notice of our astronomer, and its ending was but unsatisfactorily noted by him, owing to the presence of clouds at that time.

About the 10th of December was the critical period of our life at Conger, as a number of the men gave indications of being mentally affected by the continual darkness. Their appetites for a time failed, and many signs of gloom, irritation, and depression were displayed. The Eskimo, however, were more seriously affected than any of the men. These symptoms of

restlessness and uneasiness were noted by me as early as the 8th, and every effort was made by personal intercourse to restore these Greenlanders to a cheerful mental condition.

On the 13th Jens Edward disappeared, leaving the station in early morning, without eating his breakfast or even taking his seal-skin mittens. The morning was a dark, gloomy one, with threatening aspect, which soon manifested itself in a fall of snow. To ensure striking the right trail, Sergeant Brainard was sent directly north of the station for nearly a half mile, and Sergeant Rice to the south, both parties being provided with lanterns, which would enable them to describe a half-mile circle around the station to determine positively the direction taken by the Eskimo. His tracks were found with some difficulty southward toward Dutch Island and Robeson Channel. Sergeants Brainard and Rice, with Private Whisler, pursued him, followed later by Dr. Pavy and a sledge. He was overtaken near Cape Murchison travelling rapidly northward, but returned to the station without objection, and in time recovered his spirits. No cause for his action in this respect could be ascertained other than his intense desire to return to his home, or place himself in some situation in which, according to the superstitions of Greenland, he could have supernatural knowledge of it.

In the pursuit Sergeant Rice, in one of his many falls in the rough ice-foot of Robeson Channel, seriously injured his shoulder. He was sent back by Dr. Pavy in charge of Private Whisler. The latter, in his extreme zeal to be of assistance, had left the station without orders, and was far too thinly clad for such exposure. The weather was moderately warm (-29° F., -33.9° C.), but the over-exertion, followed by a reaction, so affected him physically and mentally that he would have perished from cold had it not been for Sergeant Rice's judicious and persistent efforts in his behalf. The success of his action



ICE FOOT AND PRESSED-UP ICE, CAPE MURCHISON, ROBESON CHANNEL.

(From a photograph.)

was all the more creditable and surprising, as Sergeant Rice's right arm was entirely useless from his fall.

Sergeant Rice succeeded in getting Whisler within about a mile and a half of the station, when the returning dog-sledge fortunately reached them, and he was soon brought to the station. The exposure affected Private Whisler's mental faculties in much the same manner as was vividly described by Kane in the experiences of his party, when several men eventually perished. It was several hours after his return to the station before Whisler was entirely in his right mind. Eskimo Christiansen, a few days later, seemed to have the same intention of deserting as Jens, but fortunately was dissuaded.

These affairs gave me great uneasiness until the returning sun and the commencement of spring work engaged the attention of the Eskimo, and rendered them more cheerful and contented. In connection with the action of these men, it should be said that the members of the expedition had always treated the Eskimo in the kindest and most considerate manner, carefully avoiding any rough pleasantries with or allusions to them. Inspector Smith had kindly advised me on this subject before leaving Upernivik, informing me of the facility with which the Eskimo, not well acquainted with the English tongue, misunderstood acts and allusions. The generally received opinion as to the extraordinary appetites of the Eskimo was not borne out by the actions of our two natives. The excellent, hearty appetites which they had on joining were never excessive, and were soon equalled by those of our own men. As to seal-blubber, they would not even taste it at Fort Conger, and later, during the retreat, ate it sparingly and with reluctance.

On December 16th our mean temperature for the day was for the first time lower than -40° (-40° C.), being -40.9° (-40.5° C.) corrected. Two days later my journal says: "It is remarka-

ble how our little puppies, that are but six weeks old, endure the cold. They rush out from the lean-to into the open air at a temperature of -40° (-40° C.) and -45° (-42.8° C.), in order to obtain bits from the slop-bucket, and to-night two or three running into the water as it was thrown out, and remaining quiet for a minute, were actually frozen to the spot, and had to be cut out with a hatchet. They appear none the worse for their misadventure."

The winter solstice, although marking our shortest day technically, was by no means the darkest. For a portion of the day the air was filled with falling spiculæ of frost, which were not sufficient to prevent a view of the stars. The outlines of Proteus Point, four-fifths of a mile distant, could be seen. A number of the party visited Dutch Island, among whom was Sergeant Brainard, who, on attaining his twenty-fifth birthday, was, in accordance with the general practice, relieved from duty. The darkest day of the winter, owing to the thick mist and fog, proved to be December 12th, on which the want of light and other unfavorable conditions did not prevent Lieutenant Kislingbury and others from taking their daily walk toward Dutch Island.

My journal of December 21st says: "We have long looked forward to the coming of this day, and its advent is a source of blessing and relief to me. It removes all fear that the winter may not pass safely and comfortably, and so lightens my heart and mind most materially. The blessings of continual health and exemption from serious accidents, except in Gardiner's case, should cause feelings of gratitude to spring up in our hearts toward that Divine Providence which has us all in His keeping. The sun to-night turns northward in its course, and in a few days darkness will give place to returning light, which, as with many other blessings, has never been fully appreciated until it took flight."

CHAPTER X.

CHRISTMAS AND THE NEW YEAR.

IT appeared surprising that the mere fact of the sun having commenced its northward journey should have such a marked effect upon the spirits of the men as was visible in the days immediately following the winter solstice. It was the most striking illustration of the many instances in connection with our Arctic experiences as to the powerful influence exercised over the physical conditions of the body by the existing mental conditions.

The solstice past, the attention of the expedition was drawn to other considerations incident to the season, the most important of which were the preparations for the proper celebration of the Christmas holidays. It was fortunate that the preparations for Christmas entailed certain work and physical exertion on the part of some of the party, as Sergeant Brainard, who had systematically kept the men at useful labor, completed the last steady outdoor work on the 22d, when the officers' quarters were completely banked up with snow. This labor, with the ordinary routine, sufficed to keep the men from brooding too much over the contrasted conditions as to the coming and past Christmases, and yet kept their minds healthfully on the pleasures of the holidays.

In order that the quarters should be especially neat and tidy for the coming celebration, they were overhauled a day or two in advance, and the floor was thoroughly washed and scraped.

The fact of washing out our quarters may seem an ordinary

circumstance to a person unacquainted with the peculiar conditions of Arctic life, but it was perhaps an unique experience that the sleeping-quarters of an Arctic party were thoroughly washed and scoured in midwinter. Whatever water is brought into the quarters in this manner must necessarily be taken up by the air and deposited elsewhere in the shape of hoar-frost. The fact that water continuously froze on the floor in all our rooms necessitated scraping the floor after washing it. This precaution, with a slight increase in the fires, succeeded in giving us thoroughly clean quarters for our Christmas exercises, without any inconvenience or suffering following.

The preparation of the Christmas dinner was commenced several days in advance, as from its extensive character much extra labor was entailed upon Frederick, who was the regular cook. Unfortunately he burned his arm quite badly on the 22d, but, despite his condition, requested that he be permitted to complete his tour of duty. Long, who was considered the especial cook of the party, with his customary cheerfulness, assisted Frederick in the preparation of this important meal.

The capacity of our excellent cooking-range, with its large ovens and hot-water boilers, was thoroughly tested on Christmas Day. When Frederick, the cook, had planned out a place for cooking the many dishes for the great dinner, he was thrown into a state of dismay on learning that plum-pudding had been added to the list. He came to me, saying that he did not see how he could cook this dish, as his range was taxed to its utmost; and he was much relieved to learn that Mrs. Greely had sent a case of pudding as a Christmas present for the expedition.

The quarters thoroughly cleaned, Sergeants Brainard and Rice took upon themselves the task of elaborately decorating the quarters with such flags, guidons, and other articles as could be used in draping or ornamenting. I refrained from visiting

the men's room, until on Christmas eve I was notified that my presence was desired, and on entering I was greatly delighted with the changed appearance of the general quarters. The room, low-studded and unpainted, had never presented a cheerful aspect, even in our days of sunlight, and during the winter season the accumulation of soot from the soft coal burned in the quarters had given it an air of gloom and darkness, which was largely enhanced through the subtle influence of association by the monotony of the long days passed within it. The room was now well lighted, and with its elaborate trimmings had a gay and lively appearance not unlike that presented by army quarters in the far West on like occasions.

I made a few remarks suitable to the festival we were to celebrate and with reference to our peculiar situation, apart from and yet a part of the great civilized world.

I had assigned to Sergeant Rice the grateful task of distributing the Christmas gifts, and he performed his duty with pleasant and well-received remarks befitting each gift and its appropriateness for the recipient. We had neglected to provide ourselves with a Christmas tree, and our new country afforded not even the semblance of a shrub, the largest plant—the creeping Arctic willow—being about a foot long and not over an inch above the surface of the ground. In consequence the presents were spread out on our largest table.

The thoughtful consideration of a few friends and well-wishers of the expedition, some of whom were personally unknown to any of us, had resulted in the donation of many articles both valuable and useful. Every officer and man received a package addressed to him personally, and some were sent for distribution at the discretion of the commanding officer. The idea was a most happy one, and it would have done the generous donors much good could they have known the keen

pleasure their gifts made in the hearts of the men who received them. A number of the men, who had lived lives marked by neglect and indifference on the part of the world, were touched even to tears, although they strove man-like to conceal them. The commanding officer received a fan—not needed for Arctic use; and Lieutenant Kislingbury a small dog, which excited the more amusement when he turned away the ridicule by calling out, “O! Schneider, don’t you want to buy a dog?” Poor Schneider did not hear the last of it for several days. The prosperity of the joke lay in the fact that Schneider had for many weeks devoted his spare time and attention to the successful raising of our Arctic puppies.

These gifts were supplemented by a number from the commanding officer, which were distributed by lot—some of value and others of an amusing character. A plentiful supply of eggnog, and the removal of the restriction as to the hour of retiring, made the evening a delightful one, and long after the Sabbath and Christmas came together the quarters resounded to hymns, chants, carols, and sentimental songs.

Christmas morning came clear and cold, with a temperature of freezing mercury, which moderated later in the day. The calm air, unstirred by wind, made exercise tolerable, and all sought the harbor-floe for a long walk, in hopes of a marvellous appetite.

At 10 A.M. the Psalms for Christmas were read, to which I added as appropriate the second selection, consisting of the 139th and 140th Psalms. This reading was supplemented by the singing of a hymn and the doxology, led off by Lieutenant Kislingbury. I remember no service in all our Arctic experiences which so affected and impressed the men, unless it was that at our first burial in the winter at Sabine. Our thoughts and tenderest feelings could not but go out to those we had left

behind, with doubts and fears as to whether it fared well or ill with them, never distrusting but their hearts were with us in our Arctic Christmas.

Christmas falling on Sunday, no amusements of any kind were attempted, but everyone waited with interest and a certain impatience for the dinner, which was as elaborate as our stores would permit.

The *menu* for the dinner was as follows: Mock-turtle soup, salmon, fricasseed guillemot, spiced musk-ox tongue, crab-salad, roast beef, eider-ducks, tenderloin of musk-ox, potatoes, asparagus, green corn, green peas, cocoanut-pie, jelly-cake, plum-pudding with wine-sauce, several kinds of ice-cream, grapes, cherries, pineapples, dates, figs, nuts, candies, coffee, chocolate. Egg-nog was served to the party in moderate quantities, and an extra allowance of rum was also issued in celebration of the day.

The candies, plum-pudding and cigars were the most appreciated, not only for the satisfaction they afforded the taste, but as being gifts from thoughtful friends. The cigars came from an army lady who knew the weakness of the rank and file for the consoling weed, and the candies were from a leading confectioner of New York City.

On the 26th the men were busy in the preparation for a variety show, which was set for that evening, as Christmas had fallen on Sunday. The Lime-Juice Club announced that they would perform at the Dutch Island Opera House for one night only, and that dog-chariots could be ordered at 10 P.M. The admission fee was in tobacco, the current coin of Grinnell Land.

The first act was a representation of an Indian council, which ended with a war-dance. Nine of the party participated in this scene, which was admirably rendered. Most of the actors had served in the far West, and some had spent months continuously in Indian camps, and so were thoroughly familiar

with the parts they portrayed. I doubt very much if a more realistic representation of the wild red-man was ever presented in the Arctic Circle, if elsewhere.

A female impersonation followed, by Schneider, which afforded amusement for the party, but particularly so to the Eskimo. Schneider had provided himself at the Greenland ports with the entire costume of the Eskimo belle, and being a small man, was able to squeeze himself into the garments. As he appeared on the scene with his elaborate make-up and closely-shaven face, one was struck by the excellent resemblance to the Innuït belles whom we had seen in lower latitudes. In his *amovt*, or woman's hood, he brought the largest of his charges, one of the Grinnell Land puppies, who was nearly frightened to death by the applause which greeted his first advent into polite society. Excellent comic songs by Henry were followed by equally amusing imitations of a well-known military character by Connell.

The entire party were prepared for a delightful and interesting literary treat from Sergeant Jewell, who announced that he would give a select reading. It proved to be a well-received jest, which ended the entertainment for the evening. Jewell entered, and after elaborately arranging and opening a large volume, carefully hung up an aneroid barometer and made a special reading of it for the meteorological information of the party.

The full light of the moon came to us again on the 27th, affording a clear and excellent view of the surrounding country, which had been hidden from us for a long time by the intense darkness of the moonless midwinter. We congratulated ourselves that this luminary would remain with us until the reflected rays of the sun would give us again some faint light at midday.

On December 30th my journal says: "I was glad to hear

a very warm and long debate between the party as to the relative merits of the cavalry and infantry arms of the service. This has been the favorite topic among the men, but the despondent humor of the dark days has prevented its recent discussion. The recommencement of these debates proclaims the return of their former good spirits to some of the party." The character of these debates may be imagined from a pertinent statement of Sergeant Brainard, who said that "no argument of any topic of a theoretical character appears to be settled until the owner of the strongest pair of lungs in the expedition is discovered."

December 31st, "The month appears to be ending with very low temperatures. Yesterday and to-day the mercury has been frozen the greater part of the time."

The maximum for December was -10° (-23.3° C.) on the 2d, and the minimum -52.2° (-46.7° C.) on the 24th. The mean of -32.01° (-35.6° C.) has rarely been exceeded in December. The thickness of the new ice was found to be thirty-four inches, an increase of but one inch during the month.

The last day of the year came, and, as at Christmas, the restrictions regarding the hour for retirement were set aside, and the party determined to watch the Old Year out and the New Year in. The watch was enlivened by songs until midnight, being followed afterward by dancing and by a concert from a well-organized calthumpian band, in which the tinware of the expedition played an important part.

The spirits of the party were by no means dampened through an extra allowance of alcoholic liquors. A scrub-race was got up between Biederbick and Schneider to Dutch Island and return, a distance of nearly four miles, in which a small quantity of rum was the hard-earned prize. The men kept up their songs and amusements until three o'clock in the morning.

Later in the day Sergeants Jewell and Lynn visited Mount Campbell to read the instruments, but were unsuccessful in finding them, having taken the wrong ravine on the island. An incident in connection with their return evidenced the great readiness with which, under certain conditions, sounds are heard in Arctic temperatures. I went out of the quarters to listen if I could hear them coming, and from the sound of their voices judged them to be within a short half-mile of the house. Although my extra clothing was only a thin jersey and a light pair of mittens, I concluded I would go out and meet them, the temperature standing at -28° (-33.3° C.). To my surprise, however, I walked nearly two-thirds of the way to Bellot Island before meeting them, and learned on inquiry that they must have been on the hill overlooking Pound Point, and at least two miles from the house when I first heard them.

Of the day my journal says: "Our New Year opens well. It has been a warm day, from -10° (-23.3° C.) to -30° (-34.4° C.), with a touch of wind not at all comfortable. I delayed the service an hour this morning to give the revellers of last night an opportunity for needed rest. It gave me great pleasure to see how bright and cheery the men were last evening. Their good spirits, quiet contentment, and increased appetites ensure us against scurvy this present season. Our unbroken numbers, excellent health, undiminished courage and strength are subjects of deep thankfulness." So, in health, good-will and comfort began our New Year in Grinnell Land.

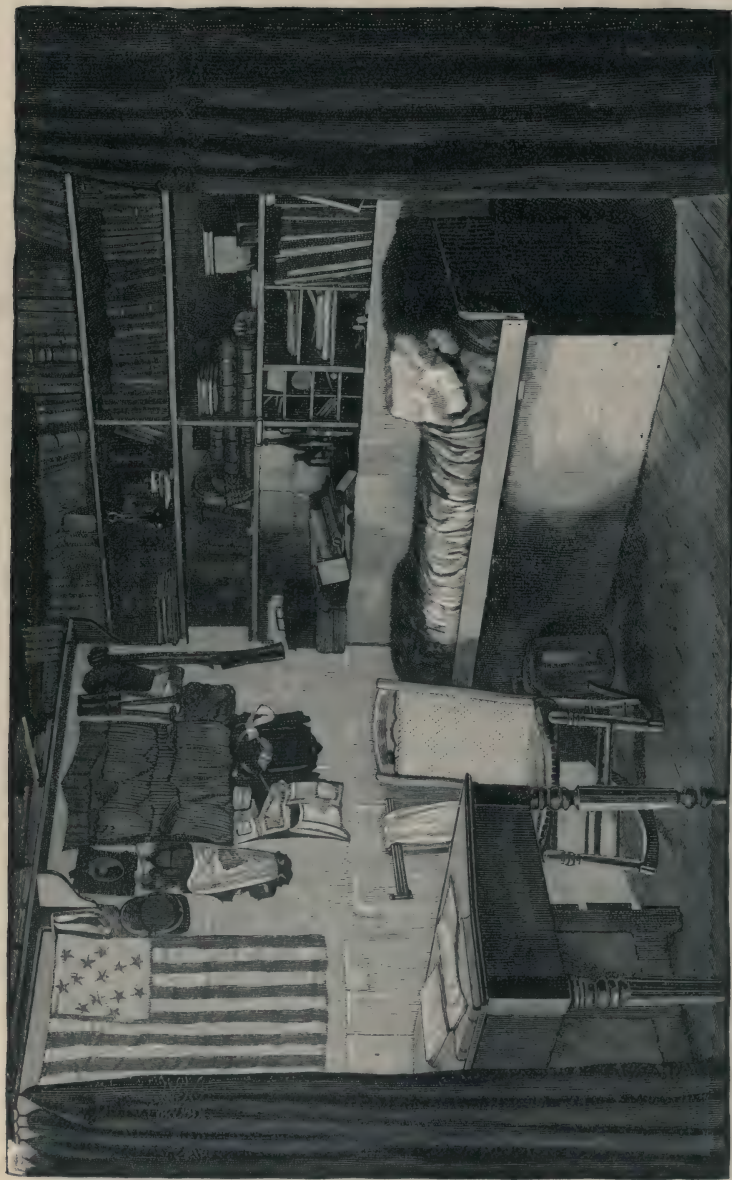
CHAPTER XI.

WINTER EVENTS.

IF the early days of January came to us with faint light, they brought sharp cold. The mean temperature fell 19° (10.6° C.), from -31.2° (-35.1° C.) the 7th to -50.3° (-45.7° C.) on the 9th, and the day following the minimum touched -58.2° (-50.1° C.).

In the meantime the entire quarters had been made as comfortable as was possible. The house had been well banked up with both earth and snow, and all cracks in the men's quarters had been papered over so that no draughts were possible. The men had constructed shelves over their bunks, and had arranged curtains, which insured a certain privacy whenever they sought it. In the officers' room such shelves and conveniences had been erected for each one as were desired. The surgeon had his books, instruments, and such medicines as he wished, on shelves constructed in his corner.

My own domain of eight by eight was in general thrown into the main room, but heavy curtains were so arranged that at night, or whenever I desired privacy, they could be drawn so as to cut off my corner from view. Such little personal trappings as I had taken with me were arranged to the best advantage. On shelves near me were placed my personal books and the excellent Arctic library we were favored with. To save space, my bunk was built on the top of an ammunition-chest, in which the greater part of my clothing was packed.



LIEUT. GREELY'S CORNER AT FORT CONGER.

(From a photograph.)

A small desk, a rocking-chair, and some private carpeting added much to my comfort as I daily applied myself to mental work. The ink froze nightly at my head, and the water spilled on carpet or floor at all times turned to ice, but as a compensation the thermometer by day—if day there be without the sun—rose to 90° (38° C.) around my head. Despite these and other drawbacks, it was a comfortable nook to me in that time, and it will always abide in my mind with pleasure, as a place where I did good work myself and planned better for others.

The 16th of January was a day we long remembered at Conger. My journal says: "We have had to-day the most violent storm I have ever experienced, except a hurricane on the summit of Mount Washington." The barometer commenced falling .05 inch hourly at 7 A.M., with calm, cloudy weather. I watched the barometer hourly, the fall increasing until it reached .10 inch an hour at 11 A.M., with a southwest wind of eighteen miles. Observations were then made every fifteen minutes. An hour later the barometer had fallen another tenth of an inch, and the wind, which had suddenly changed to the northeast, attained a velocity of over fifty miles an hour. The air was so full of snow that I ordered the temperature observation to be made by two strong men together, and the tide reading by two others. It was with difficulty that they succeeded in reaching the instruments. It took six of the best men with ropes to make the 1 P.M. readings, when the wind was blowing steadily at fifty-two miles from the northeast, in which quarter it remained. At 2 P.M. the barometer still fell with the same rapidity, and the wind had attained a velocity of sixty-two miles. It was quite impossible to quit the house, and a thermometer was read just outside the southwest door. The wind was then blowing a hurricane, the air full of snow, and the house shook and creaked in an alarming and ominous manner. Every instant

I expected that the roof would be twisted or torn off, and the whole building blown into the open harbor. Such a catastrophe would have left us in desperate straits, and would probably have proved fatal to some of the party. The violence of the wind for over an hour kept us in a state of suspense as to what would be our fate.

The highest registered wind was at 2.15 P.M., northeast, sixty-five miles per hour, but about 2.40 P.M. the wind, which had been blowing steadily, changed into violent gusts, which probably reached eighty or ninety miles an hour. The anemometer-spindle broke short off, and the cups blew several miles into the harbor before they caught and stopped. At 3 P.M. the barometer was at 29.028, a fall of over half an inch (.504) in five hours. The pressure remained nearly steady for three hours longer, but at 4 P.M. the wind had fallen to about forty miles, and observations out of doors were again renewed with some danger and difficulty. If our buildings had not been well banked up with earth and snow, they would have been torn to pieces beyond a doubt. In one respect this storm was an extraordinary one. Payer, in commenting on a statement of Hayes of a storm at -27° (-32.8° C.), says it is probably a typographical error. The general principle that storms do not occur at very low temperatures is sound, and it is equally obvious that during storms the temperature rises rapidly and that observers in the field overrate the velocity of cold, cutting winds. The wind blowing fifty-two miles an hour in this storm, at a temperature of -13° (25° C.), is probably unparalleled. Other remarkable winds at low temperatures occurred January 23, 1882, southeast, thirty-four miles at -25.2° (-31.8° C.), and March 6, 1882, east, twenty-one miles at -27.2° (32.9° C.).

The day following my journal says: "Two days of storm and cloud have passed since the noonday twilight has been

seen, and now our eyes note a perceptible change. The southern sky at noon gave us marked assurances of the returning sun. Fine bands of cirrus clouds on the southern horizon were finely colored, the dark-crimson streaks of warm color being overlaid with daffodil-yellows, that shaded gradually into the pearl-grays. Though there has been during the winter a moderate amount of snow, considering the low temperature, yet the hill-tops are now quite bare and show less covering than in October. Yesterday's storm has stripped every exposed place of its usual snow, to pack it in dense, hard drifts in the hollows of the ground and the cracks and other interstices of the harbor-ice. For the first time during our experiences, it would now be possible to cut blocks of snow and build a snow-house. The snow in these low temperatures has none of the soft, fleecy appearance seen in lower latitudes. Each flake, hard and separate as an atom of sand, only unites to its neighbor under stress of force and pressure. It is the snow of our western prairies, only in a more aggravated form, which there, filling a railway cutting, resists so successfully all efforts of trains or snow-ploughs to force a passage."

In nearly a month prior to the storm, only two faint displays of aurora were noted, but in the week following it occurred on four days. In the display of January 19th there was a beautiful auroral arch from horizon to horizon in the magnetic meridian, during the presence of which the needle was greatly disturbed, swinging repeatedly off the scale. The aurora of January 21st was wonderful beyond description, and I have no words in which to convey any adequate idea of the beauty and splendor of the scene. It was a continuous change from arch to streamers, from streamers to patches and ribbons, and back again to arches, which covered the entire heavens for part of the time. It lasted for about twenty-two hours, during which

at no moment was the phenomena other than vivid and remarkable. At one time there were three perfect arches, which spanned the southwestern sky from horizon to horizon. The most striking and exact simile, perhaps, would be to liken it to a conflagration of surrounding forests as seen at night from a cleared or open space in their centre. During the display Sergeant Rice exposed a sensitive dry photographic plate toward the aurora without any effect, but the experiment was a doubtful one from the shifting of the light. In general, the aurora was quite colorless, though occasionally red tints were reported. Despite the remarkable duration and extent of the aurora, the magnet was but slightly disturbed. During the display the new moon appeared, a narrow crescent which, strange to say, was exactly the color of blood.

Sir George Nares remarks that, "contrary to the popular belief, the aurora gives us no appreciable light." In our experience the light was considerable on several occasions, and in this case I saw my shadow cast, at a time when the brilliant display was in one quarter of the heavens only. Tromholt says on this point: "The very greatest amount of light which the aurora borealis emitted, or which, in any case, I was able to ascertain during my entire sojourn in Lapland, may be compared to that of the moon two days and a half after full, when 25° above the horizon and the sky is clear."

On the 23d, print, such as is used for leaders, could be read with some difficulty at noon. This test, however, was not a satisfactory one, owing partly to the presence of the moon, but more to the remarkably varying capacity of eyes for this work. A brilliant meteor was observed in the north about 7.35 A.M., which burst into fragments, all colorless except one, which was a brilliant red. No detonation was heard.

On January 29th Lieutenant Kislingbury gave us much

anxiety by a visit to Cape Murchison, during which he was absent for over seven hours, in temperature ranging from -45° (-42.8° C.) to -54° (-47.8° C.). Owing to a previous alarm on account of Lieutenant Kislingbury, I had requested him to note the time of his departure, and the intended direction of his travel, when leaving the house, so as to insure his being found in case of any accident. About 4 P.M. Dr. Pavy entered the station considerably excited, saying he had been to Water-course Bay following the tracks of Lieutenant Kislingbury, who had evidently gone to Cape Murchison, and that, as a light breeze was blowing in the outer harbor, he thought the journey dangerous. Lieutenant Kislingbury's record stated that he had left at 10.30 A.M. "for Dutch Island and perhaps Distant Cape." At 5 P.M., as nothing could be seen of him, the dog-team was harnessed, and a quarter of an hour later Dr. Pavy, with Sergeant Brainard and Eskimo Christiansen, started out. They met Lieutenant Kislingbury about two miles from Dutch Island, suffering somewhat from the trip. He reached the station at 6 P.M. Of course, being warmly clad, he was safe, unless some accident occurred or a wind sprang up, when he must have necessarily suffered from the exposure. As no object was gained by this trip of twenty-five miles in Arctic darkness, I requested that such a long absence should not be repeated until the return of the sun. The road was found to be in excellent condition, and wolf and fox tracks were observed. It eventually transpired that Lieutenant Kislingbury's nose was frozen during the trip, caused, as he said, by riding on the sledge after it reached him.

January 31st: "The presence of a musky piece of beef to-day gave rise to general discussion as to the causes of this flavor to our meat. Such pieces are found but occasionally, and the history of them has been looked into. The weight of evidence

favors the belief that immediate dressing of the animal obviates the difficulty." An example the following summer seemed to bear out this opinion: An old bull was killed, which, when running, was said to have exhaled such an odor of musk that it was perceptible at a distance of several hundred yards. It was naturally supposed, though he was immediately dressed, that the meat could not be eaten. To avoid prejudice, I had a quarter served without the knowledge of any one except Sergeant Brainard, and the meat proved free from taint or musky flavor.

Though the glory of the sun had gone, with its wealth of color in halos and sunsets, yet my journal shows that there are other beauties in an Arctic winter than the auroras. Of the many beautiful coronas and paraselenæ, a few will illustrate all. A very beautiful corona, 6° in diameter, was seen the evening of the 30th. It consisted of four concentric circles around the moon, the inner white, the second yellow, the third blue, and the outer red.

On February 1st a lunar halo of 90° was reported, but it had disappeared by the time I was able to leave my bed, and I found two halos of 22° and 46° respectively, which were of exceptional brilliancy and splendor. In the evening of that day a most remarkable lunar halo was visible, the moon at the time being about 25° above the horizon. The circles of 22° and 46° were perfect to the horizon, and were both tipped with contact arches. Six mock-moons were present, two on either side of the true moon, and two above it, all of which showed brilliant prismatic colors, very like the clear, distinct colors seen in rainbows. Spears of light extended from the moon vertically, reaching downward to the horizon and upward to the outer circle. In addition, a narrow streak of clear, white light extended from the moon horizontally on both sides completely around the entire horizon, at an altitude of 25° the same as

that of the moon itself. At times a faint mock-moon without rainbow colors was to be seen 90° distant from the moon, being in the north, while the moon itself was in the east, and a second faint one under the moon, so that eight mock-moons were visible at one time. The phenomena, while more marked and of longer continuance, was said to be of the same character as that



Lunar Halo at Fort Conger, February 1, 1882.

F. LEBLANC

noted in the early morning. The display lasted for over an hour, the number of moons varying during the time.

The halo was preceded by an aurora, which was unaccompanied by magnetic disturbances.

At local noon of February 2d, the thermometer on the south side of the tide-house was read without a lantern. The spirit thermometer on the floe, at 5.30 P.M. the same day, read *corrected* -64.8° (-53.8° C.). Regarding extremely low temperatures, I express my opinion that below -60° (51.1° C.) all

readings from alcohol thermometers must be viewed with suspicion unless the alcohol used is known positively to be pure. By my observations it was found that three parts pure alcohol to one of water, deposited substances the color and consistency of lard. At a temperature of -60.4° (-51.3° C.), four parts of alcohol to one of water, assumed the consistency of a light syrup, although unchanged in color. This would indicate that, say at -80° or -90° , pure alcohol might deposit a sediment.

The following interesting experiments were made as to the effect of low temperatures on various liquids: On February 3d, alcohol, chloroform, brandy, glycerine, ether, nitric acid, and spirits of turpentine, all from standard preparations of the United States Medical Department, were exposed at a temperature of -55° . The brandy froze solid in less than an hour, and the nitric acid, beginning to crystallize, formed into a solid substance resembling lard, although the temperature rose to -47° . On the 14th of February, in a temperature of -59.4° , the spirits of turpentine showed a slight solid sediment, while the main portion of the liquid appeared viscous. Muriatic acid remained unchanged. Sulphuric ether exhibited small crystals suspended midway in the liquid, and a deposit resembling gum camphor partly dissolved. The chloroform showed small spiculæ in suspension near the bottom. Concentrated English rum assumed the consistency of a light syrup, but otherwise remained unchanged.

On the last-named date, medical alcohol and fuel alcohol (the latter near proof) were exposed at a temperature of -55° without undergoing change. At the same time three parts of medical alcohol to one of water were exposed in one vessel, and four parts of alcohol to one of water were exposed in another. In a few hours, at a steady temperature of -55° , the first mixture showed a deposit resembling soft lard in color and consistency,

while the latter remained unchanged to the eye, but had apparently thickened. The following morning, a temperature of -60.4° having been experienced, the latter liquid had visibly thickened, although no deposit took place. The pure alcohol remained seemingly unchanged.

During this extreme cold weather I observed closely our Eskimo dogs, expecting to see signs of great suffering from cold among them. The only manner in which a calm cold was ever seen to affect them was in causing them at times to lift first one foot and then another from the bare ground as though it burned them. A tent was erected for them, and later the surgeon had some snow-huts excavated, but they never entered the latter, and only sought the shelter of the first during severe wind-storms. One occasionally crept into a closed-up tent, where blankets or clothing could be found.

The favorite sleeping-place was the freshly strewn ashes, and many strove for the top of the ash-barrel, which afforded room for but one. Often have I seen a dog tempted to leave the barrel in order to attack a rival, only to return with a crestfallen look to find his place occupied.

Sometimes failing to dislodge a comrade comfortably ensconced on the coveted barrel, a dog jumped on top of the first comer and curled himself up contentedly. The under dog knew by bitter experience that to quarrel was to lose his bed, and remained until worn out by the weight of his rival. Others sought that portion of the coal pile which was free from snow. Unless they had litters, but one or two of the dogs would ever sleep under cover, and such as did so were put in coventry and harshly treated by the remainder of the pack.

Sergeant Gardiner, much to our gratification, returned to duty early in February, and once again the party of twenty-five were all for active duty. The broken bone had united slowly,

but yet much quicker and better than the surgeon anticipated. The continuous absence of sunlight, the lack of exercise, and unvarying monotony of life are all against an invalid in the Arctic regions, but Gardiner's spirits never failed him.

Some experiments were made at this time regarding the freezing of sea-water, which, at a temperature of 28.9° (-1.7° C.), was placed in a barrel banked with snow, the temperature of which was about -40° (-40° C.). On the day following the water was examined, and ice was found to have formed exactly six inches thick on the top, in a mean temperature of -48.7° (-44.8° C.). My journal says: "This result is at variance with Payer's statement, that he has seen the open sea freeze at a similar temperature twelve inches in a day." Subsequently ice formed over the remaining sea-water, from which the covering of ice had been removed the previous day, to the thickness of 5.7 inches in twenty-four hours, at a mean temperature of -47.8° (-44.3° C.).

February 3d, though not the coldest day, was that on which the lowest temperature of the season occurred. The mean temperature was -52.9° (-48.2° C.), with a maximum of -44.1° (42.3° C.) and a minimum of -62.2° (52.3° C.). On the harbor-floe a substandard, which, under similar conditions, read with the thermometer in the shelter, recorded -63.1° (-52.8° C.), or 0.9° (0.5° C.) below the regular instrument.

The protective influence of a snow-hut was shown by the fact that on February 5th, after a mean temperature below -50° (-45.6° C.) for five consecutive days, the thermometer inside the tide-house read -17° (-27.2° C.), which was the lowest touched since a door had been put on the snow-house.

February 6th my journal says: "The southern sky at local noon to-day was filled with colors of the most exquisite loveliness, a rich, deep red shading into a remarkable purple." Feb-

ruary 6th was the coldest day; the mean temperature being -53.8° (-47.7° C.), although the minimum did not touch -60° (-56° C.). This unusually cold weather was noted in connection with the greatest atmospheric pressure recorded to that time. The barometer touched 30.613 during the day. Despite the remarkably low temperature, Sergeant Brainard was hunting for nearly two hours and saw many hare-tracks.

Jens and Frederik hunted on the following day, seeing hare-tracks but no game. Our first spring animal, a wolf, was seen by Sergeant Rice on the 10th, near Proteus Point. Jens hunted assiduously, but saw no animals until the 15th, when he succeeded in killing a hare, the first game of the season. We were surprised by its weight, which was eleven pounds gross and six when dressed. Its excellent condition showed that, despite the severity of the weather, it had found sufficient and satisfactory food, principally buds of the *Saxifraga oppositifolia*. The animal was densely furred, the long hairs being filled in near the body with a remarkably fine down-like hair. It was entirely white, except a few black hairs at the very tips of its ears.

On the following day Frederik and Jens each shot another of about the same weight as the first killed. This game was welcome as a guarantee for the future, but the meat was not vitally necessary, 'as on February 17th we had about twenty-three hundred pounds of musk-meat and two hundred guillemots still on hand at the station, besides two musk-cattle cached in Water-course Bay.

February 16th, at midday, the southern horizon showed a bar of gold resting on the Greenland hills, above which the sky was faintly tinged with a Nile-green color, which shaded toward the clear heavens of the zenith into a delicate bright blue. By contrast the northern horizon, entirely clear of clouds, appeared



ARCTIC CLOUDS OVER BELLOT ISLAND.

(From a photograph.)

of a distinctive dark blue, which was almost black in its intensity. As the day was so clear, I sent Lieutenant Lockwood and party to read the instruments on Bellot Island, and busied myself in sound experiments at -61.1° (-51.7° C.). Lieutenant Lockwood and men were gone about five hours, but escaped any frost-bites, notwithstanding the very low temperature. He complained much of the many falls from lack of shadows, which prevented them from travelling rapidly, as without such aid hollow and hill are alike to the eye.

The most marked instance of deception from this cause occurred in the experience of Lieutenants Rawson and Egerton, R.N., with a dog-team, when the dogs, unable to detect inequalities in the ice, ran directly over a precipitous floe and fell eight feet, the animals evidently thinking the floe to be entirely level.

At 10 P.M., February 16th, the mercurial thermometers thawed out, after having been frozen continuously for sixteen days and five hours. This is the longest time on record during which mercury has remained frozen. The Alert, in 1876, experienced a similar spell of cold, during which the mercury was solid for twelve continuous days. The longest period of similar temperatures by Kane's record is but five days.

Sergeant Rice, hunting on the 20th, shot at a hare, but did not obtain him. He reported that the hare travelled for a hundred or more yards at a time by jumping on its hind legs, for distances of six to eight feet, never touching the ground with the forepaws. He said he thought it at first an optical illusion, but the tracks confirmed his eyesight, showing the hind feet only to have touched the snow.

The measurement of the sea-ice on February 21st showed a thickness of fifty-two and a half inches, an increase of eight inches in ten days, in a mean temperature of -48.5° (-44.7° C.).

This is an unusually large increase, probably the largest on record, considering the previous thickness of the ice.

Washington's birthday was celebrated by an elaborate dinner and by races and shooting-matches. The snow-shoe walk was won by Biederbick, and rifle-shooting at a hundred yards by Private Long. The return of Lieutenant Lockwood's party from his successful trip to Cape Beechy added to the zest of our celebration. The temperature remained steady at -44° (-42° C.) during the day, which hardly encouraged out-of-door sports.

The day following Sergeant Elison and Private Whisler were sent to Depot "A" (Cape Murchison) with dog-sledge, to re-pitch the tent and to put it in good condition for future travellers. Dr. Pavy also accompanied them, and, while they were at work pitching the tent, carried a small load of pemmican and alcohol to the north side of St. Patrick Bay.

Lieutenant Kislingbury visited the summit of Mount Campbell on the 25th, and reported that from all appearances the storm of January 16th must have been the most severe at that point for the previous six years. The cairn erected by the English expedition in 1876 was blown over, and the spar surmounted by the iron pipe was broken short off. From Lieutenant Kislingbury's account, the spar and cairn had been lifted by the wind and carried five hundred yards, where wedging between two rocks they were caught fast.

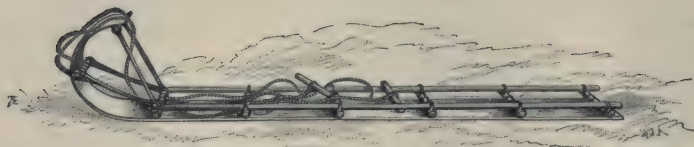
Hunting during the latter part of the month was assiduously pursued with no results. Unfortunately two of the hares, which had been hung up, as it was supposed out of reach of the dogs, disappeared. Suspicion naturally rested on two dogs, who accepted their food from the cooks in a nonchalant manner, which is quite unusual with these animals. This was the first meat thus lost.

February 25th: "The cold weather just passed has been remarkable for its duration as well as its severity, the mean temperature for thirty-five days, January 20th to February 24th inclusive, has been -47.1° (-43.9° C.). During this time the mercury had been frozen solid except for sixty-seven hours."

While hunting, on the 25th, Sergeant Brainard found several cross sections of a petrified tree near the station and about nine hundred feet above the sea. The several sections varied from five to eleven inches in diameter, of which the longest, on the surface of the ground, was eighteen inches. A few sections projected from the ground a foot or two. Fragments were strewn around, but no limbs or knots were observed.

Sergeant Brainard, referring to the greenish-yellow tint which had come to all our faces, and which the near approach of the sun rendered very noticeable, says: "A few of our vainest men were observing themselves in a mirror by the noonday light. Much to their gratification their pallor gave a delicate appearance quite unusual to their smoke-begrimed countenances in quarters."

Our last day of winter came, and with it the long expected return of the sun. Lieutenant Kislingbury and Private Whisler climbed Bellot Island and saw the whole disk, but the rest of the party, as the temperature was -46.6° (-43.7° C.), were content with a view of the upper limb from the station. Light clouds veiled its coming as well as its departure, and no shadows were cast, but we could see that it was there. The scene was neither impressive nor magnificent, yet I think all our hearts re-echoed that exclamation of "blessed sun" from the poor Italian of Payer's expedition, while thanking God that to us in health and strength the sun had reappeared, and our first Arctic winter had ended.



Hudson Bay Sledge Pattern. Relief Expedition, 1884.

CHAPTER XII.

PREPARATIONS FOR SLEDGING.

ACTIVE preparations for spring sledging were commenced early in February, and by the middle of the month the main quarters had been turned into a great workshop for our saddler, tinman, and carpenters. Sledges, boat, cooking-lamps and utensils, sleeping-bags, foot-gear, etc., were in process of invention, manufacture, or repair.

These preparations entailed great circumspection and forethought before they were finally completed. To send out a sledge party for a long Arctic journey demands that careful planning and thorough outfitting which can be successfully done only after a certain amount of field experiences, supplemented by thoughtful consideration of the difficulties to be met with and as to the means best adapted to overcome them. Indeed, not only the success, but the very safety of a party may be put in jeopardy by the neglect of seemingly trifling matters. The dangers which may arise from the dampening of matches was illustrated in the experience of one of our parties in the early spring days, and the leaking or loss of the alcohol-lamp or can in the field would prove a dangerous if not a fatal circumstance.

The lamps, if not properly made, increase largely the chances of destroying the tent by fire, even if they escape exploding to the great danger of the party.

Sir Edward Belcher, in his first trip, lost an entire day's ration of alcohol, and endangered the tent by the use of a soldered cooking-lamp, from which the filling-tube fell off the first time the lamp was lighted. These and other similar defects are such as can be provided against by care and forethought.

The success of any sledging party depends almost entirely on two important points: First, the adaptability and the state of perfection of the entire travelling-gear; second, the ability of the chief to reduce the constant weights* to a minimum, while retaining everything absolutely essential to the maintenance of perfect health and the performance of satisfactory scientific work.

The retreat of Franklin's expedition proved fatal through these principles being neglected, and, indeed, the lack of success in most cases can be traced, directly or indirectly, to a failure to fulfil these conditions.

It had been my original intention that the greater part of the work of exploration should be done with dogs, of which three full teams had been purchased in Greenland. Of twenty-seven dogs purchased at the Danish ports, only twelve were living at the end of 1881. All the teams had been attacked by disease introduced by the dogs sold to me by the governor of Upernivik, from which sickness the greater part perished. Fortunately there were three private dogs in the expedition, one of which belonged to Dr. Pavy and two had been given to me personally. This enabled me to put into the field two teams of seven dogs each, to which Dr. Pavy added to his

* Constant weights are those hauled from beginning to end, such as tentage, sledges, instruments, cooking and other gear.

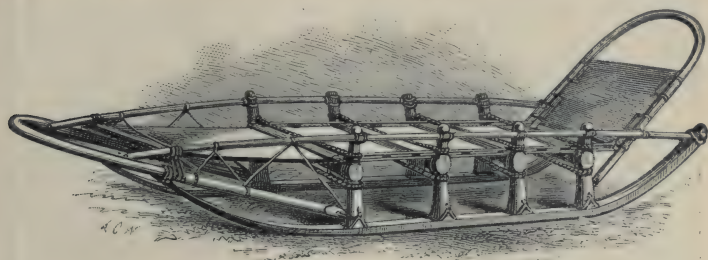
own team his private dog. Careful attention had resulted in the saving of nine of the puppies born the previous November, but their use in the field that spring was quite out of the question, though I counted, and properly, on making them useful later in the season. This loss of dogs caused me to modify my original plans, in which I had intended that the supporting sledges, drawn by men, should never be absent from the station for more than a week.

The question of sledges was an important and difficult one to settle. The McClintock sledge, which was so strongly endorsed by Payer and the English expedition of 1875, was viewed by me distrustfully, owing to its partial failure with the latter expedition, which used it entirely. Although the enduring powers and strength of my men were remarkable, yet it could not be expected that, as a whole, they should be as strong as the men of 1875, who were selected from the whole of the royal navy. When their picked crews had failed, I could not expect to succeed if I followed the same methods.

The Hudson Bay sledges had been strongly recommended by Dr. Rae, and I finally decided to use that pattern for my supporting sledges on the North Greenland coast, particularly as Lieutenant Beaumont's experience showed the existence of deep, soft snow, in which the McClintock sledge would be substantially useless. In consequence four Hudson Bay sledges were made, which were shod with a light strip of ash fastened to the bottom at either side so as to serve in a measure for runners. In one sledge the strip of ash was shod with steel, but as its use seemed to indicate that the increased friction made shoeing a disadvantage, I unfortunately abandoned my original idea, and sent out the remaining sledges shod only with wood. I should have remembered that Back's voyageurs hauled only a hundred pounds on their sledge, yet the rough travel

wore out the runners, and the sledges were nearly broken up till he shod them with steel.

To future explorers in high latitudes, I recommend Hunt's pattern of the St. Michael's sledge as made for the Relief Expedition, 1884, with the important addition of *steel runners*, which should be so arranged as to be attached or detached at pleasure; an extra runner both steel and wooden to be carried on long journeys. This with the Greenland sledge would fulfil any ordinary field conditions, but when a retreat is contemplated or boats are to be hauled, the Melville sledge should replace the McClintock, of which it is an improvement.



Hunt's St. Michael Sledge. Relief Expedition, 1884.

These Hudson Bay sledges, with lashings and coverings complete, each weighing about thirty-five pounds, entailed less weight upon the men than would the McClintock. In addition, the sledge would wear out and not break, while the McClintock sledge, with its mortised stanchions and tight rivets, is a structure that cannot remain long unbroken after its rigid frame is subjected to the violent shocks consequent on travel over very rough ice.

They possessed this further advantage, that as four Hudson Bay sledges replaced one McClintock sledge, whenever the food consumed or placed in caches reduced the weights of the party to any considerable extent, the constant weights would

be regularly decreased by abandoning a sledge as soon as its load could be divided between the remaining sledges. In this way it seemed possible to materially reduce the dead weight to be hauled as the party proceeded, a condition essential to marked success, as the strength of all sledge parties must necessarily diminish as they advance. At the farthest point reached, and in the return journey, but thirty-five pounds of sledge would be hauled by the party, as against one hundred and thirty to one hundred and eighty pounds weight involved in hauling a McClintock sledge.



Greenland Dog Sledge.

It was to be expected that long experience should make the Eskimo of Greenland cognizant of the best pattern to be used for such purposes, and so the Greenland sledge was adopted as our pattern for the dog-sledge. The lashings of the Greenland sledge being of seal-skin permit the sledge to be handled in the roughest possible manner without its being materially injured.

The only serious danger of breaking the Greenland sledge is in its runners, which split longitudinally through the row of holes bored to receive the lashings. The upstanders and the runners

of our sledges were carefully strengthened by setting in plates of wrought iron, so that the chances of splitting were greatly diminished. The pine slats commonly in use in Greenland were replaced by the best American ash, hickory, or oak. Even with the utmost precaution the slats will be gradually worn out, and finally broken, by the constant pounding and friction on the rubble and hummocky ice. It is consequently essential that two or three extra slats should be carried.

Dr. Pavy had experimented somewhat in regard to the modification of the Greenland sledge pattern with ill suc-



Ancient Eskimo Sledge—Found at Cape Baird $81^{\circ} 30' N$.

cess, as he reduced the length of sled, and so added to its unmanageableness under difficult conditions. As the shortening theory had failed, it later occurred to me that in the rough rubble ice, which all of the parties were certain of experiencing to a greater or lesser extent, the changed conditions necessitated a longer sledge to avoid the front catching at the bottom of a declivity, and a broader one to prevent upsetting. Eventually the sledges were lengthened some six inches, and were made about three inches broader. This result, it is true, increased the weight of the sledge from ninety-

five to one hundred and five pounds, but it was found that the advantages derived were so great that, after once trying the new pattern, no officer was willing to go on a long journey with the old sledge. It is interesting to note that old Eskimo sledges, discovered later at Cape Baird, on the shore of Lake Hazen and elsewhere in Grinnell Land, were proportionally of even greater length than our improved pattern.

The question of the sledging ration was one of vital importance. It is true that the daily allowance of a man should be confined to such amount of food as is barely sufficient to maintain his health and strength, but it is better to err on the side of safety than to incur the serious danger of diminishing the strength of men subjected to such arduous labor and great exposure.

Sir Edward Parry, in 1827, adopted nineteen ounces solid food as his sledging ration, an amount which he found to be entirely insufficient for his men. Dr. Rae in one journey adopted twenty-nine ounces, which was not enough, and later took thirty-four ounces, which was supplemented somewhat by game. Other parties have found thirty-two ounces, when *all* pemmican, enough solids. Convicts at hard labor in England receive fifty ounces solid food—mostly bread and vegetables, however. Payer believes that from forty to forty-five ounces solid food are necessary for a sledging man daily, and he states that McClintock, the great Arctic sledge traveller, allowed from forty to forty-eight ounces. The Arctic expedition under Captain Nares adopted a sledging ration of thirty-eight ounces solid food, an amount, I think, inadequate for the maintenance of strength in an extended trip, unless it consists of pemmican or other highly concentrated substances, such as it is evident most men cannot assimilate properly. The solids of the Nares ration were twenty ounces of meat, fourteen of biscuit, two each of preserved potatoes and sugar, which, with four ounces of fuel, two

of rum, an ounce of chocolate, a half ounce each of tea and tobacco, with condiments, made a grand aggregate of $46\frac{7}{10}$ ounces.

I concluded to increase the solids to thirty-nine ounces, and to add an ounce of lime-juice and a half ounce of fuel, by substituting food, etc., for rum. The sledge ration of 1882 was viewed as a tentative one, and, while the parties remained in perfect health and did remarkable work, yet, owing to the general representations, I deemed it necessary, in 1883, to increase it and to modify the character of the food by replacing bread with butter and meat. The ration I finally decided on for the latter year was twenty-two ounces of meat, two of butter, four of vegetables, ten of bread, two of sugar, one-half ounce of milk, one ounce of tea and chocolate, salt one-fourth, and pepper one-twentieth of an ounce. The alcohol allowance of 1882, four and a half ounces after April 30th, (five ounces *before*), was increased the following year to six, as being the smallest amount on which a party of three or four could properly cook their food. The ration of 1883 consisted, besides beverages, of forty and a half ounces of food. Three-fourths of the meat ration were about equal quantities of pemmican, bacon, and frozen musk-meat, while the balance was made up of canned sausage and corned beef.

As a result of my experiences, I would now recommend the same quantity of solid food, but would place the vegetable ration at three ounces preserved potatoes, replacing the other ounce by a half ounce each of milk and of extract of beef. Of the twenty-two ounces of meat, I do not think that more than eleven ounces should be pemmican, the balance to be divided between bacon and fresh meat; the latter to be sliced fine and frozen. In case fresh meat cannot be obtained, it would seem to me well to make the remaining eleven ounces of meat consist of four ounces of bacon

and the balance of sausage and canned fresh meat, the latter to be cooked as little as is possible consistent with its preservation.

With the present means of carrying large quantities of fresh meat, it seems unnecessary that any future expedition should be deprived of this invaluable antiscorbutic, and of all men those in the field should be provided with it. Lime-juice pemmican proved to be very unpalatable, and was only eaten under press of hunger.

The use of butter and condensed milk in the field cannot be too highly commended. Tea, the true Arctic drink, should be used for three-fourths of the meals in the field; the balance should consist of coffee in preference to chocolate. It seemed to be generally admitted by our parties that chocolate could not be drank in the field, except at camping, as it seemed to induce thirst during the day if used before the march. The use of extract of tea and extract of coffee would probably reduce the weight of beverages to one-half ounce, and in place might be substituted curry-paste or some other powerful condiment. If extract of tea cannot be used, the tea taken should be compressed.

No rum was ever sent as a sledge ration, but a liberal amount was always furnished as medicine, with authority for it to be used on extraordinary occasions at the discretion of the officer in charge. In outfitting another sledge party I should furnish it with a small quantity of rum, not exceeding an ounce a day, to be used under similar restrictions.

On the above ration of 1882, parties kept the field for forty days in a mean temperature below zero (-17.8° C.), and returned in health and strength; and others for shorter periods in extreme temperatures did arduous work without detriment to health and strength. At depots and on return marches the parties occasionally had an opportunity of an extra allowance,

which probably raised the average solids to forty ounces daily. It is not to be assumed, however, that the ration of 1883 is beyond criticism; but, as success commands attention and respect, our experiences are not to be lightly passed by. The acids of limes, milk, and raw meat enter into it, and the peculiar qualities of beef extract and of potatoes supplement them. The variety of diet, and the sufficiency of fuel to properly heat the food, are also important points.

Tobacco was not used as a sledge ration, and each man was expected to carry on his person such as he desired to use. One or two of our men regularly abandoned the habit while serving in the field.

It was a constant practice in establishing supplementary depots for returning parties, to add to them an extra amount of canned fruits, such as pears, apples, cranberries, and also sugar and milk. These articles were most in demand by the hungry and exhausted sledge-men.

Regarding the vexed question of lime-juice, no trouble was experienced in its use as a sledge ration. The amount to be used in advancing was furnished the party frozen into small squares, each of which represented a ration. This ration was most acceptable to the men in the field, and on occasions it was taken in a frozen condition, much to the refreshment and invigoration of those who were in quite an exhausted condition. My surgeon, however, disapproved of this method of taking it, although the immediate result seemed beneficial. The lime-juice for return trips was sent in rubber bags, which, of course, froze solid, but on the return journey the temperature was always high enough to melt it. In any case, as lime-juice thaws at a temperature of about 14° (-10° C.), it could be easily brought to a liquid state by keeping it in a sleeping-bag over night.

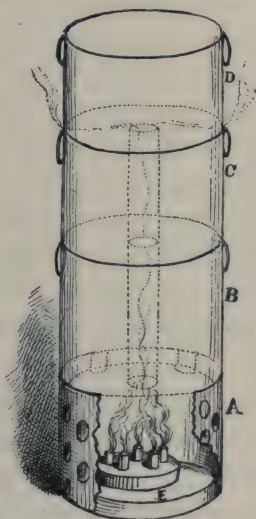
Alcohol of great strength is the best field fuel, and should be carried in tightly sealed vessels of about two gallons, which not only insures safety by dividing the supply, but enables caches to be frequently made for the return journey and the dropping of empty tins. The soot and smoke from stearine are quite unbearable, and entering the lungs must affect the health in long journeys. A sufficient number of india-rubber bags to carry two gallons of alcohol were taken for ordinary use.

Our cooking utensils were of the simplest character. The lamp and all the cooking vessels were fire-proof, made as far as practicable of single pieces of heavy tin without solder. Careful and systematic experiments caused us to adopt a cooking-lamp having five wicks, but it is evident that the number of wicks to be used must depend on the extent of the heating surface to be exposed to its action.

Speed in cooking and economy of fuel by no means go hand in hand. The successful economy of an alcohol cooking-lamp depends very largely on skilful manipulation of the wicks, which must be pulled up just far enough to allow the heat given forth to be entirely utilized, so that the food is cooked with a minimum amount of alcohol. The best lamp, then, is that which does the greatest amount of work on the allowance of fuel. Our experiments were made in a field-tent in a temperature of -20° (-28.9° C.), and the snow used for melting was at a temperature of -30° (-34.4° C.). These conditions were similar to those in later field work, except that we experimented on snow, which requires more fuel than ice to reduce it to water. The field lamp in sixteen minutes melted enough snow to produce two and a half quarts of water, and ten minutes later raised it to the boiling-point. At the same time, in an upper vessel, there was made one and a half quart of water, and it was raised to a temperature of

33° (+0.6° C.). Four ounces of alcohol were expended in this work. This agreed well with the results obtained by Payer, who boiled three gallons of water from snow at -13° (-25° C.) to -22° (-38° C.) by an expenditure of twelve ounces of alcohol. Payer does not say, but I suppose his experiments were made in the field. Our small lamp for two men boiled water at an expense of one-eighth ounce alcohol to each pint of water, a greater expenditure than with our large lamp, in accordance with the well-known fact that fuel ration can be decreased as the number to be cooked for is increased. This latter lamp, which, with its frame and cooking-vessel complete, weighed but sixteen ounces, was called by the men the "Tramp's Companion."

The accompanying illustration shows the cooking apparatus. A is a stout, sheet-iron cylinder with perforations for air to reach alcohol lamp E, which fits closely in the bottom of the cylinder. B and C are tin fire-proof vessels with cylinder in centre, which allows heat to rise to D, where bits of iron, laid crosswise on top of C, allow the smoke, with some little heat, to escape. In this way but little heat is wasted. D inverted fits into A, covering and protecting E while packed. Despite the seemingly frail character of this apparatus, it withstood all tests, and one vessel and lamp, used for two months northward, afterward did service for many months through our retreat and life at Sabine. In preparing future lamps and cooking vessels, the bottoms should be, I think, of tolerably heavy copper.



Field Cooking Apparatus.

Contrary to the generally received opinions, fur clothing, even for field services, was not highly valued by the members of my party. It was the general experience that complete double suits of woollen underclothing of the best quality, with the outer clothes of common, thick, woollen material, was all the covering that was necessary to insure comfort in the field. It is important, however, that the surface of the outer garments should have a smooth finish, so as to prevent the adherence of snow to the cloth. In order to avoid this result, the army stable-frocks and overalls, which were made of very light canvas, were worn as outer garments, and proved very satisfactory in this respect; the men, taking them off at night, were able to enter their sleeping-bags with their outer garments in an entirely dry condition. Seal-skin *temiaks*, or jumpers, were found serviceable only in windy weather, and were but little used. Seal-skin trousers were tried by nearly every man in the party, and were discarded by the majority of us, although some adhered to the use of them.

However prudently a man may work, he cannot prevent perspiration from starting while pulling on the sledge or running after it. The moisture thus engendered passes readily through woollen underclothing to finally form as hoar-frost on the exterior surface of the outer garment, from which it can be brushed. But when seal-skin is worn the moisture collects on the inner side, and saturates all the underclothing as well as the seal-skin itself; unless the exertion is steadily continued, the damp seal-skin freezes, and is about as convenient and comfortable as a coat-of-mail. When camp is made, the unfortunate sledge-man is not only obliged to thaw out the seal-skin suit with the heat of his body, but must also dry up the moisture. This operation is not only unhealthy, but it induces cold, makes drafts on his strength, and interferes with his reg-

ular sleep. These objections largely disappear when a man can travel leisurely, and refrain from exertions to such an extent as to be free from perspiration, conditions which in Grinnell Land are not possible with successful exploration.

The great trouble in Arctic field service is to protect the person from frost-bite. This is not as difficult as is generally supposed, and whenever frost-bites occur it will be almost invariably found that the officer or men have neglected well-known and strongly emphasized precautions. Inexperience or imprudent carelessness causes nineteen-twentieths of such cases. These remarks have reference particularly to exposure to temperatures above -30° (-34.6° C.), as that amount of cold, from observation, appeared to me to be about the minimum to which men can be exposed for a long time, without the man has extraordinary resisting powers or is most carefully equipped. No man should be put in the field who perspires excessively, or whose circulation is not excellent.

The whole foot and hand gear must be soft, pliable, and never tight enough to in any manner impede the circulation.

Pliability permits that easy and continuous flexure of the joints which in Arctic travel is absolutely essential to maintain warmth. The inner covering of the foot should be some non-conducting material, which not only retains the heat generated by the foot, but permits perspiration to pass through. Nothing is better than heavy, *closely knit*, all-wool socks. Only one pair of socks should be long enough to reach the knee, the others reaching just to and slightly above the ankle-joint. Some preferred to replace the shortest sock by a blanket wrapper, which is only the sock in a clumsy shape. The outer foot-gear may be either moccasins or the Labrador or Greenland boot, which some prefer, owing to its being oil-tanned and capable of resisting, unchanged, *occasional* immersion in

water. The moccasins should have light canvas leggings. Both moccasins and boots should be taken, and should be made to order to insure their being large enough, numbers to run from nine to twelve. One pair of each is a *minimum* allowance for each month of sledging that is to be expected of each man.

Failure to obtain moccasins expected from Canada, and inability to procure many boots in Greenland, obliged us to supplement our supply by home manufacture. Canvas boots did not prove a success, but the second winter our saddler, Frederick, extemporized foot-gear which answered admirably all requirements. It consisted of an *ugsuk* skin bottom, so skillfully turned up and sewed that no seam was exposed as a wearing surface, with felt-cloth tops. Inner soles of buffalo, bear, or reindeer skin are very desirable—the hair clipped short—which, taking up the moisture from the socks, keeps the inner sole of boot or moccasin dry. I cannot recommend dog-skin or other skin inner socks for wear in travelling. They undoubtedly are excellent when parties travel very slowly or ride much on the sledge. They should be furnished, however, without fail, for use as sleeping socks.

Woollen mittens (no gloves), with an outer pair of seal-skin, answer for the hands, if supplemented by indispensable woollen wristers, which, extending downward from midway between elbow and wrist, leave fingers and thumb free for use. In low temperatures the bare hand must be always available. The outer seal-skin mittens should have two thumbs, and fit either hand equally well. In the field they should be secured to the coat by lanyards. To lose a mitten is sometimes dangerous.

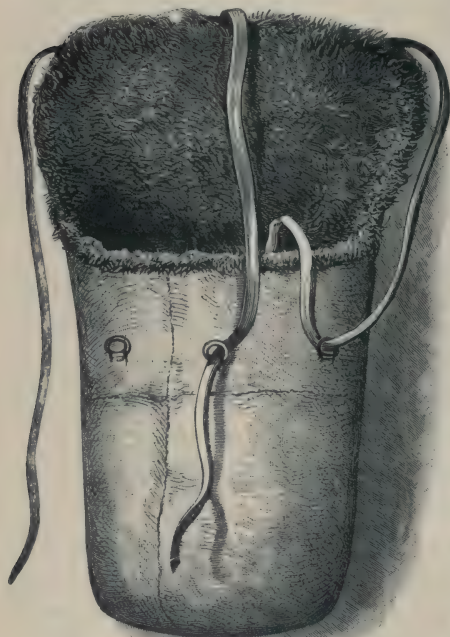
The head is best protected by a whaler's cap, a leather woollen-lined cap with a turn-down attachment, but individual taste can largely be consulted. Not only is there no satisfactory protection for the face, but face-cloths or preparations,

such as glycerine, etc., are dangerous in very low temperatures. During travel, facing a wind—which should very rarely be done—the face is largely protected by a seal-skin covering, which projects several inches in front of the face and resembles a *poke* bonnet. The projecting portion is kept stiff by a small piece of bent whalebone. The face, especially the nose, must be kept from freezing by the frequent application of the warm hand, which is simply placed against the part in danger of freezing, and is never violently rubbed over it. The danger of applying snow of a temperature of -40° (-40° C.) to an already frozen nose, is evident from the mere statement of the case; but when it is rubbed, the snow, being like fine sand, grinds off the cuticle of the nose or face. One of our party, ignorant of this fact, rubbed nearly all the skin from his nose, which swelled greatly and gave him much after-pain and suffering.

Goggles of neutral-tinted glass should always be worn over the eyes during long journeys; otherwise no man is certain of escaping snow-blindness, which entails great pain on the person, extra labor on others, and perhaps causes failure of the journey. It is difficult to enforce this rule, which is equally important on dull or on bright days.

Our sleeping-bags were of well-tanned buffalo-skin, which can be recommended. Sheepskin was tried, and found to make a warmer bag, but they cannot be recommended for long or important journeys. They are not only heavier, but they collect moisture very rapidly, and are soon a mass of ice. The bag should slope gradually, with increasing size from the bottom, which should be large enough to afford comfortable room for the feet, to a broad flap, which can be pulled down over the head by strings running through rings, as shown in the illustration, and then into the sleeping-bag. If lightly covered with strong oiled silk or thin rubber-cloth, it would be much

improved, thus preventing the collection of moisture which increases the weight greatly and adds much to the discomfort of



Three-man Buffalo Sleeping-bag.

the occupants. Each bag should be for two, or at the most three, men. Men sleeping singly suffer much more from cold than in double bags. Our tent-cloths, though excellent, could have been well replaced by light gutta-percha mattresses, which, inflated with air and placed under the bags, would add much to the warmth of the travellers.

Common army tents were used by us for field service, and in these were spread rub-

ber tent-cloths, which, made to order for Arctic service, never cracked or split from severity of the cold, as has sometimes occurred in previous expeditions. Regular tent-poles and iron pins were made use of. It seems possible that a rubber tent could be invented which should unite both tent and cloth, and which could be kept upright by a light frame; but tentage in general is a simple question, in regard to which personal preferences can safely be yielded to. The dog or shelter tent should be used when practicable, owing to its extreme lightness, in late spring or early autumn travel.

CHAPTER XIII.

THANK GOD HARBOR AND HALL'S GRAVE.

LIEUTENANT LOCKWOOD'S WORK.

OUR first spring sledging anticipated the return of the sun by ten days. Lieutenant Lockwood left on February 19th, accompanied by Sergeant Brainard and Eskimo Christiansen, with dog-sledge Antoinette. His orders required him to visit depot "B" near Cape Beechy, and to examine the ice in Robeson Channel, with a view of selecting the best route to be followed in a later trip to Thank God Harbor.

The ice-foot from Fort Conger to Cape Beechy was found to be in excellent condition, the rubble ice being packed with hard snow. The low temperature, -42° (-41.1° C.), caused the sledge to drag with great difficulty, owing to the extraordinary amount of friction. The tent at depot "A" in passing was found to be blown down, probably by the violent gale of January 16th.

The snow-house at depot "B," constructed the previous autumn, was completely concealed by drift snow, which covered the roof of the house several feet deep. In digging out the entrance to the snow-house, the self-registering thermometer, from which I had hoped to obtain the minimum temperature of the winter at Cape Beechy, was unfortunately broken.

Sergeant Brainard, in his field journal, records: "Found a considerable quantity of snow in the snow-house, which had

blown down the stovepipe and formed above the stove a cone-shaped mound, which reached nearly to the roof. Working rapidly, in about an hour we had the satisfaction of seeing the house and passage clear and a glowing fire in the little stove. I wonder if we are not the first Arctic travellers who, on such a trip, have had a good coal-fire and a snow-house over it."

On the 20th Lieutenant Lockwood and Sergeant Brainard examined the ice opposite the depot in the direction of Polaris Promontory. They found much hummocky ice intermixed with considerable rubble, conditions which were hardly satisfactory for sledging. While the party were occupied in this reconnaissance, the temperature at the station was -52.6° (-47° C.), but they were so satisfactorily clad that they did not suffer excessively from cold, although they were obliged to watch each other's faces to prevent their freezing under the influence of a light northeast wind.

The following day they examined the ice directly eastward of Cape Beechy, and, passing through a strip of very rough ice not over two hundred yards wide, reached a level palæocrystic floe which afforded excellent sledging. They travelled several miles toward the Greenland coast, and from a high hummock saw that the road for a considerable distance to the eastward was equally favorable. The party returned to Fort Conger on the 22d, in sufficiently early time to participate in the amusements of the day.

The mercury was frozen during their entire absence, and the mean temperature was -44.7° (-42.6° C.) at the station, and probably lower in the field. In these temperatures the party had travelled between sixty and seventy miles in Arctic twilight, for the sun had not returned to us, without frost-bite or mishap. This success augured well for longer and more important journeys. February 28th was marked by the first appearance of

the sun, though its slight effect on the temperature was shown by the thermometer recording -49° (-45° C.).

On the following day, in obedience to my instructions, Lieutenant Lockwood, with sledge Antoinette, started for Thank God Harbor by the way of Depot "B." His party consisted of Sergeants Brainard, Jewell, and Eskimo Christiansen.

The main clauses of his orders required that "ten days' allowance of provisions, fuel, and dog-food will be taken from here, which will be supplemented by such additions from Depot "B" (Cape Beechy) as can be carried without materially impeding your progress across Robeson Channel. Your first duty will be to visit the observatory at Thank God Harbor, in order to ascertain exactly what supplies are there available for sledge parties. . . . It is important that the boat-camp, in the ravine about one mile east of Cape Sumner, be visited, and the condition of the whale-boat ascertained. While it is very desirable that the condition of the ice across Newman Bay . . . should be determined, . . . it is left to your judgment to abandon this part of the trip should adverse circumstances arise, or should you think time could be gained for your spring work by so doing. Points should be selected for future depots. . . . You will leave on the Greenland coast all supplies not indispensable to your comfortable and safe return to Cape Beechy. As Sergeant Jewell will probably be charged with the support of your party during the spring, you should communicate freely your views as to the best route and methods to be followed in such work. . . ."

Private Long and Eskimo Jens, with a second dog-team, which carried supplies to Depot "B," were placed under his orders, to support him as far beyond Cape Beechy as would be necessary.

Good travelling and fresh teams enabled them to make the trip to Depot "B," a distance of twenty-eight miles, in five

hours and twenty minutes. The night was spent comfortably in the snow-house, and the following morning Lieutenant Lockwood proceeded on his journey, accompanied, until the rubble ice off Cape Beechy was passed, by Private Long. Their stores having been transferred to the *Antoinette*, the supporting party returned that evening to the home station, and the other toward Greenland.

The load on the sledge *Antoinette*, on leaving Cape Beechy, was about seven hundred pounds, which enabled the team of



Greenland Coast from Cape Beechy.

eight dogs to travel freely over the palæocrystic floe. An hour and a half's travel brought Lieutenant Lockwood to the farthest point reached by him in his reconnoitering trip ten days previous. Being doubtful as to the condition of the ice in advance, he left one bag of provisions on a prominent hummock, and continued on toward The Gap (a marked indentation central in the bold, high coast which stretches from Cape Lupton to Cape Sumner). Several more hours of sledging over palæocrystic floes, varied by deep snow underlying a weak crust, brought the party to

the rubble ice, and an hour later they had the gratification of putting foot on the Greenland shore at Promontory Point (a name given to the bold headland just south of The Gap), where their tent was pitched for the night.

Five and a half hours' travelling south along the Greenland coast, on March 3d, brought them to the observatory, on the plateau above Thank God Harbor, occupied by Bessels and Bryan in 1871-2. Lieutenant Lockwood's experience that day convinced him that no ice-foot properly called existed along that portion of the Greenland coast. In this respect his experiences and opinions were verified by the observations of later parties in both that and the subsequent year. Gentle slopes of snow at times extended to the rows of stranded floebergs, affording level travel, but the difficulty of reaching it and lack of continuity rendered it better to keep out well from the shore.

Level palæocrystic floes of great extent were at times fallen in with, and in the vicinity of Thank God Harbor a considerable number of floebergs were found, most of which were probably grounded, and one of which Sergeant Brainard thought "might well be a remnant of Providence berg."

Considering that it was originally a very light structure, the observatory was in a comparatively fair condition, the sides and one end yet standing; the other end and roof were found broken in pieces, and scattered for several hundred yards in the immediate vicinity. The building affording no shelter, Lieutenant Lockwood decided to construct a snow-house instead of pitching his tent. One was dug out of a huge drift, in two hours' time.

March 4th was spent in taking an inventory of the supplies stored in the dilapidated building. As the temperature was 37° below zero (-38.3° C.), and a fresh northeast wind pre-

ailed, the work was of the most severe character. The stores found agreed in no way with those given in the *Polaris* record. The English provision-book gave a careful and detailed inventory of articles found by them in 1875, as well as of those consumed by Lieutenant Beaumont's party the subsequent year.

The following articles of serviceable food were found : Six forty-five-pound cans of pemmican, about thirty-five pounds of farina, a half barrel of lime-juice, and a barrel of yellow corn-meal. Ten barrels of hard bread, part made from Graham flour, were found in eatable condition, though some parts were slightly moulded. There were a number of miscellaneous articles in serviceable condition, the most important of which were hatchets, saws, shovels, lead, shot, gunpowder, cartridges for rifle and pistol (calibre fifty), and centre-primed shot-gun cartridges. The English ice-boat was carefully secured, and, as far as could be determined without disturbing it, was in excellent condition. Two of the coverlets left by Lieutenant Beaumont contributed much to the comfort of the sledging party in their snow-house, being a most welcome addition as the temperature fell that night to -51° (-46.1° C.).

The graves of Captain Hall and of the English sailors Hand and Paul were visited and found to be in excellent order. The head-board erected by the *Polaris* party was so well arranged originally that it still looked quite new, and stress of weather had rendered illegible but few of the letters. The handsome brass tablet erected by the English expedition under Sir George Nares, as a tribute to Captain Hall's memory, stood erect and firm with no signs of decay or weakness in its supports. Lieutenant Lockwood carried and displayed the small national flag made by my wife, which was invariably carried as a sledge flag for the *Antoinette*.

From the adjoining cairn were obtained and brought to Conger the records left by Captain Stephenson, Lieutenant Beaumont, and other officers of Her Majesty's Navy in 1875-76.

The dreariness and desolation of the country immediately adjoining the anchorage ground of the *Polaris* was commented on, not only by Lieutenant Lockwood and Sergeant Brainard, but by all others of the expedition who at any time visited it. The surroundings, all agreed, were in marked and disagreeable contrast with the immediate country around Fort Conger.

Lieutenant Lockwood decided to proceed to Cape Sumner over the same route as that followed by Captain Hall in 1870, by the way of Newman Bay. Consequently, later in the day, he examined the country in that direction, finding a level plain whose rocky, gravelly surface was but scantily covered with snow, conditions which promised to make travelling difficult.

This absence of snow as a covering for the ground, not only in Northern Greenland, but in Grinnell Land, was general in our two years' experience, and caused much comment as contrary to expectations.

Sunday, March 5th, proved a beautiful clear morning, with keen frosty air and a temperature, at 7 A.M., of -50.5° (-45.8° C.). The Grinnell Land coast, which had been hidden by low fog the preceding day, stood out clear and distinct far to the westward of them as they turned their backs toward it and started across the low country to Newman Bay. A narrow deep ravine was followed, which, rough and broken, eventually brought them out "on an extensive plain stretching to the east as far as could be seen. We found this little broken by any deep water-courses, though the absence of snow was surprising. The thermometer registered -55.5° (-48.6° C.), and there was quite a perceptible breeze blowing in our faces."

After only six hours' travelling, owing to the extremely low temperature (it had not risen above -50° (-45.6° C.) during the day) and a rapidly falling barometer, Lieutenant Lockwood deemed it the most prudent course to go into camp.

The deepest drift was searched out in a small ravine, where a hole was dug in the snow, which was so shallow that the ground was reached in less than four feet. The tent and poles covered with snow formed its roof, and the party passed a warm night, though cramped exceedingly for room owing to the small size of the house. They had scarcely entered the hut when a snow-storm with brisk wind sprang up, though the temperature at that time was -51° (-46.1° C.). Despite the storm without, the heat of their bodies and the vapor from the alcohol cooking-lamp raised the temperature to an uncomfortable degree, and from the tightness of the house nearly suffocated the party.

Sergeant Brainard in his notes that evening records: "At 11 A.M. the thermometer recorded -55.5° (-48.6° C.) while we were travelling, and a light breeze from the northeast prevailed at the same time. The temperature has remained below -50° (-45.6° C.) during the entire day, and at times we were compelled to keep the warm hand to the face continually in order to prevent it from freezing. Great as are our discomforts, we are congratulating ourselves upon the warmth imparted by our snug snow-den. The temperature has been something almost unknown in the annals of Arctic exploration, and the snow-storm which commenced about the time we entered camp, was accompanied by brisk wind, which in a tent would probably have frost-bitten some of the party severely."

Payer records a sledge journey, March 13, 1874, when temperatures of -47.2° (-44° C.) and -50.8° (-46° C.) were experienced. He says: "I do not believe that we could have

passed through the night without the help of grog, in spite of which, boiling hot, we suffered much all through the night from cold and our frozen clothes."

Just before going into camp Sergeant Brainard discovered on that winter's snow the dung of a musk-ox, which he thought could be scarcely a week dropped. He well says: "This should be positive proof that the animal does not migrate south with the sun and return the following year as the sun advances, as many assume to be his habit, but remains in some well-sheltered valley or ravine during the winter darkness, subsisting on whatever comes in his way." This incident, and my personal experience, as well as that of the British expedition, leaves no doubt that the musk-ox is a regular habitant of Grinnell Land and Northern Greenland the entire year.

The morning of March 6th it was necessary for the party to burrow out of their lodging through the snow, as the tunnel had completely filled from the drift of the prevailing storm. The temperature, which had fallen to -52° (-46.7°C.) during the night, had then risen to -36.5° (-38.1°C.), but unfortunately a fresh wind had to be faced in travelling.

Despite the continued wind and snow, the party moved onward, and in two hours reached the level expanse of Newman Bay, which was broken to the eastward only by a group of rocks which Lieutenant Lockwood thought might be Howgate Island of the Hall expedition. After four hours' travelling, the strong northerly wind produced such frequent frost-bites that it was deemed best to camp on reaching a favorable snow-drift. They were fortunate enough to find a snow-bank with a vertical front, into which a small entrance two feet wide and three feet high was dug, for four feet, and then the interior was gradually hollowed out until a large roomy chamber was formed. The entrance of the tunnel was covered with the tent, and the

alcohol-lamp used for cooking soon raised the temperature of the snow-hut above the freezing point.

The storm broke during the night, and on the morning of the 7th the sky cleared sufficiently for the sun to be seen for a time, but later snow recommenced. After breakfast, at 8 A.M., the temperature outside was -49.5° (-45.3° C.), with a brisk wind from the northeast, and during the day -52° (-46.7° C.) was recorded.

Owing to the continued wind, Lieutenant Lockwood did not deem it safe to travel, and the day was spent in the snow-hut.

The weather still continued very bad on the 8th, though the temperature rose to -35° (-37.2° C.). An attempt was made to proceed on the journey, but the wind increasing in strength caused many frost-bites, as they were facing it, and in consequence the party were obliged to return to their snow-hut.

Immediately after returning, although the hut had been vacated an hour, the following interesting observations of temperature were noted :

Outside the tunnel, -33° (-36.1° C.); on floor inside hut, $+3^{\circ}$ (16.1° C.); two and one-half feet above floor, $+31^{\circ}$ (-0.6° C.). Later, when the alcohol-lamp was burning, the temperature reached only $+36^{\circ}$ ($+2.2^{\circ}$ C.) inside the hut, but a hole had previously been cut into the roof, which was covered only by a piece of light canvas to serve as a window ; candles having been forgotten.

An incident occurred while in the snow-house which illustrated how important a thing a match may be, and how slight a neglect may imperil the lives of a sledge party. Lieutenant Lockwood and Sergeant Jewell had used up or had lost their stock of matches. Both common and wax matches were supplied to and carried by sledge-men, in water-tight cases

of rubber. Sergeant Brainard in his field-journal says: "We made the alarming discovery this evening that I was the only one in the party who possessed matches, and those in limited number. An attempt being made to light the wax matches, it was found that they would not burn, the dampness of the house having evidently been communicated to them. Recollecting that I had a box of water-proof matches in a garment which was outside of the snow-house, I procured them, and seating myself on a sleeping-bag, surrounded by my anxious comrades who scarcely dared to breathe, commenced a series of experiments on the new matches. All to no purpose; they refused to burn, as did the wax, and would just ignite the sulphur without even charring the wood. We now began to seriously consider our situation here. We were out of the usual route of travel between Thank God Harbor and Newman Bay, without light and fire, and with temperatures of freezing mercury outside our damp snow-house. We were at least sixty miles from home by the nearest route, and seventy by that we had followed. Could we live three, or even two days, without water, until we could reach Depot "B" (Cape Beechy)? It was finally decided that if to-morrow was a favorable day for travelling we could reach Cape Sumner, and the day following Cape Beechy, and although we would suffer much from thirst yet we would be able to make the journey. The revolver was suggested, and paper was prepared into which it was to be discharged, but one of the party wanted to give the matches another trial. This was done, and match after match ignited only to barely flicker and go out. Jewell finally produced a love-letter, which was very carefully worn in some inside garment, and holding a piece to the next match it caught the flame slowly and immediately communicated it to the alcohol-lamp, one wick of which was allowed to burn until we quit the snow-

house." The cause of the matches not lighting eventually proved to be the vitiated, damp atmosphere of the hut.

On the morning of the 9th, with a temperature of -34° (-36.7° C.), the party started for Polaris Boat Camp, near Cape Sumner. In a ravine sloping toward Newman Bay Brainard and Jewell saw four ptarmigan in perfect winter plumage, and Lieutenant Lockwood shot a hare, which stood transfixed with astonishment at Jewell's antics as a beater-in.

As snow was found upon the land the course was at first kept parallel with the bay, so that Reynolds Island was not to be distinguished; but later they took to the floe. The whole surface-ice of Newman Bay was smooth and level, evidently composed of harbor-ice of that season, and the snow upon its surface was packed very hard from the recent storm. Naturally this hard level snow would seem to afford easy sledging, but unfortunately such is not the fact. The dry snow at very low temperatures acts upon steel runners as dry sand, and the friction is simply enormous. The snow retarded greatly their progress, but whenever ice was fallen in with their gait was comparatively rapid. No ice-foot was found along the shore of Newman Bay.

Eight hours' travelling brought them to Boat Camp, where the whale and canvas boats were readily found. The latter boat had six oars, and was substantially in the condition described by the English Arctic reports. The hole in the whale-boat was very small, and otherwise it seemed, on careful examination, to be in excellent order.

The temperature had fallen as they travelled to -39° (-39.4° C.), and was -40° (-40° C.) when Cape Sumner was reached at the end of nine and a half hours' travel. The route from Boat Camp to Sumner was behind a series of stranded bergs, over a snow-slope which could be made practicable for a loaded



'THE ARCTIC HIGHWAY'—RUBBLE AND HUMMOCKY ICE.

(From a photograph.)

sledge only by considerable work. Worn out by the day's travel the tent was soon pitched, but their night and morning were wretchedly passed, as the sleeping-bag, saturated with moisture from the high temperature in the snow-hut, was frozen completely solid during the day, and it required the steady exertion of the four men for several hours to unroll it and force themselves within. It was necessary to thaw out this mass of ice by the heat of their bodies. As the temperature had fallen to -40° (-40° C.) this tedious operation was very trying to the chilled, weary men, and their discomfort was not lessened by the cutting, disagreeable wind experienced by them from the exposed position in which their tent was pitched—at the very point of Cape Sumner.

On the morning of March 10th Lieutenant Lockwood, in the exercise of his discretion, concluded not to visit the north side of Newman Bay, as its passage presented no difficulties and he was satisfied that the advance depot for future operations could be established readily either at Boat Camp, Cape Brevoort, or at the mouth of the Gap valley.

The entrance of Newman Bay was crowded with heavy, rough ice, which gave way to small and level floes a few miles inland. Leaving his tent, sleeping-bag, and other articles of future benefit, Lieutenant Lockwood started later across Robeson Channel, in a temperature of -41° (-40.6° C.), and reached Depot "B" in twelve and a half hours. The journey in places was slow and laborious, owing to rubble and hummocky ice, and their discomforts were largely increased by the blinding snow-storm, which for a time shut out even the nearest land.

As a result of his trip, Lieutenant Lockwood concluded that the best route to Cape Sumner was to follow his original tracks eastward until near the Gap, and then follow the Greenland coast to Cape Sumner.

The outcome of this journey was particularly satisfactory. The distance travelled was at least one hundred and thirty-five miles, in a mean temperature, as shown by their observations, of -42.3° (-41.3° C.) during their ten days' absence. The party had perfect health during their entire trip, and no frost-bites were received except slight and superficial ones on the face while travelling. The journey involved extraordinary hardships and sufferings, which demanded no ordinary powers of endurance to meet successfully. The dogs stood the trip very well, except a young animal, about nine months old, who was somewhat tired at times. A not unimportant result was to give Lieutenant Lockwood and the men confidence in their equipment and in their own powers, as compared with other expeditions. The journey from Thank God Harbor to Cape Sumner was made over the same route as that followed by Hall to Cape Brevoort, and entailed the same amount of travel. The journey was made by Captain Hall in six marches, by Lieutenant Lockwood in three, during two of which he was driven by storm to shelter. This comparison is not intended as any reflection on Captain Hall, who from eight years' experience was thoroughly conversant with sledge-work, but to point out the importance of such field-work being done by young men in the most active period of life. Lieutenant Lockwood and his comrades were about thirty years of age, while Captain Hall was over fifty. The entire distance was travelled on foot by the former party, while Captain Hall, from lack of vigor and health, was obliged to keep the sledge.

CHAPTER XIV.

ESTABLISHING DEPOTS.

(DR. PAVY AND SERGEANT BRAINARD.)

WHILE Lieutenant Lockwood was yet absent at Thank God Harbor the sun returned, so it was rendered possible to commence the establishment of depots. The small caches near Mount Parry and the large English depot at Lincoln Bay were sufficient for the use of the party that was detailed to travel north over the Frozen Sea. The North Greenland exploring party was unfortunate in having no nearer base of supplies than Depot "B," which was separated from Greenland by a broad channel nearly twenty miles wide.

To insure the success of work on that shore, I determined on establishing a depot at Polaris Boat Camp near Cape Sumner. To this end Acting Assistant Surgeon Pavy, who had volunteered for spring sledging, was sent, with Sergeant Lynn, Eskimo Jens, and dog-sledge Lilla, on March 5th, to convey a sledge-load of provisions to as northerly a point on the Greenland coast as could be reached in one day's march from Cape Beechy.

The trip to Depot "B" was comfortably made in nine hours in a mean temperature of -36° (-37.8° C.). The sledge load of about seven hundred pounds was dragged by seven dogs. The severe gale which drove Lieutenant Lockwood to camp, after four hours' travelling, likewise detained Dr. Pavy on the

6th in the snow-house near Cape Beechy. The day was spent comfortably, for, although the outside temperature registered -34° (-36.7° C.), yet the interior temperature was raised to $+26^{\circ}$ (-3.3° C.) by an Eskimo lamp.

On the 7th, after ten hours' severe work in a mean temperature of -38° (-38.9° C.), Dr. Pavy pitched his tent on the floe in Robeson Channel, some two miles from the Greenland coast. During this journey he met with a misfortune through improper packing of the sledge, which resulted in the loss from it of a two-gallon can of alcohol and the breakage and leakage of another. This accident also entailed a couple of hours' delay in an unsuccessful search for the lost alcohol.

March 8th, leaving his tent standing, Dr. Pavy proceeded with his party to the shore, two miles distant, and cached the supplies in a marked break in the coast, midway between Capes Sumner and Lupton, which was designated as the "Gap." The cache, established behind an erratic block, was marked by a signal flag, which Dr. Pavy says was planted "about thirty or forty feet above the ice-foot, its bright red color forming a striking contrast with the slab of Devonian limestone of the neighborhood."

The trip to and from the shore had been made in a storm, but as later in the day it abated, the tent was struck and the party started homeward. They camped on a floe three miles east of Cape Beechy. This day's trip was very severe and uncomfortable, as the temperature varied from -28° (-33.3° C.) to -37° (-38.3° C.) with a northeast wind.

During the night an incident occurred which showed the considerateness and kind heart of our Eskimo Jens Edward. Sergeant Lynn was feeling badly on entering his sleeping-bag, and had fallen asleep before Jens finished his work. The Eskimo, fearing he was sick, was unwilling to disturb him, and decided

to sleep outside the bag, without covering other than his fur travelling suit, rather than awaken his comrade to his discomfort. Although the temperature outside the tent sank to -41.7° (-40.9° C.), the ability of Jens to endure cold was so great that he escaped with but one toe slightly frost-bitten.

The party reached Conger in good condition March 9th. This journey, successfully made in such great cold and strong wind, reflected credit on Dr. Pavy's energy and determination, and that officer gave due credit for their assistance to his subordinates, Lynn and Jens.

On March 13th Sergeant Brainard, with seven men, was ordered to move the small boat *Discovery*, with such additional supplies as could be hauled, to the depot to be used at or near Cape Sumner. His orders required him to follow the route recommended by Lieutenant Lockwood, and, after securely caching the boat in the Gap, to establish a depot of provisions at such point as could be reached in Newman Bay, the mouth of the Gap valley being preferred. He was also to build a snow-house, if possible, but his absence was not to exceed six days. His closing orders read:

"You are cautioned particularly against travelling in stormy or windy weather, and you will frequently question your party as to their condition, and avoid over-work. I trust your speedy and safe return may be soon noted. You must bear in mind that you start in a temperature of about -40° , and at an almost unparalleled early season of the year."

The main points of Sergeant Brainard's journey are taken from his field-journal. They started on a clear, calm morning in a temperature of -37.3° (-38.5° C.). The load of over a thousand pounds hauled very hard, "it dragging over the dry, soft snow with about the same noise and resistance as would have been experienced over a sand-bank." In order to make

Depot "B" that day, Sergeant Brainard dropped two hundred pounds of pemmican and moved quite rapidly to Depot "A." There they stopped thirteen minutes to drink some chocolate taken from the station in a rubber bag wrapped in a buffalo robe; the temperature then was -44° (-42.2° C.). After twelve hours' work, during which they travelled twenty-five miles, they reached Depot "B" in an almost exhausted condition. Sergeant Brainard says: "On our arrival the temperature was -53.5° (-47.5° C.). We all retired early, very tired and in a 'broken-up' condition. A few complained during the day of terrible thirst, but there being no remedy for them they had to endure it as best they could. Those who are excessive tobacco-chewers were the most affected."

The party left the snow-house (near Cape Beechy) at 7.30 A.M., March 15th, the temperature standing at -50.5° (-48.8° C.), although it had been down to -61° (-51.7° C.) a few hours previous. A bright, beautiful sunshine with calm air made travelling quite endurable. Four hours and a half of hard work brought them to Cape Beechy and to the rough rubble ice.

Here the very hard work commenced; the broken, jagged pieces of ice afforded a most uncertain and precarious foothold, while the irregularities of the surfaces rendered hauling doubly difficult. By dint of extraordinary exertions the sledge was got through the rubble to a palæocrystic floe, but the rough work necessitated the relashing of the boat on the sledge. This was trying work, not so much for the active handy men, who hauled and pulled at the lashings and so kept warm despite a temperature of -43.5° (-41.9° C.), but to the unemployed, who danced around shivering in desperate efforts to keep their clothes, damp with moisture, from freezing to the rigidity of brass. As they moved on, the uneven, rolling surface of the

floe was covered with a light covering of snow, just deep enough to require the men to plough their way and to demand every atom of their strength to pull the sledge through it. Occasionally a bare descending bit of ice came, just enough in extent to force the exhausted men for a few yards into an accelerated pace and give emphasis to the jerk which, as snow came to clog the runners, a moment later brought all up standing. After nearly nine hours of such travel, Sergeant Brainard concluded that the condition of the men was such as to render camping necessary, as continued pulling without food or drink in such low temperatures had quite exhausted them. The temperature, then at -43.5° (-41.9° C.), had not been above -40° (-40° C.) during the march.

An order to camp is obeyed with alacrity, not that it is a comfortable or pleasant thing to do, but because work of any character is preferable to standing quietly around. The only continued comfort for an Arctic sledger is while he is engaged in the drag-ropes hauling a fair load at a moderate pace over a level bit of ice.

With skilled hands the sledge is rapidly unlashed, and while the main party sets up the tent the evening cook is searching out a blue-topped berg, from which to get his ice for tea and stew. The tent is well pitched on a proper site, which preferably is a level snow-covered bit of floe, with a large berg near to the windward to break the force of any sudden gale. If snow cannot be found suited for the site of the tent, it is best that snow be brought and strewed within it. This not only gives a soft bed, but a comparatively warm one, for ice is almost invariably colder than snow.

The rubber tent-cloth spread, the sleeping-bags are brought in and laid down, but to unroll them is a labor of love demanding the strength of a Hercules. The moisture which exhaled

the night before from the body, the falling spiculæ of snow formed that morning in the tent, the lingering vapor from the stew, and the drops of spilled tea have all insidiously worked their way deep into the tangled hair, and, turning to ice, have bound fast the tightly rolled buffalo bags. Now they are more like coils of rolled sheet-iron than the supple well-tanned skins they are supposed to be. By great exertions they are finally forced apart, and the wise sledge traveller, be his wisdom from book or experience, seeks them at the earliest moment.

The work of erecting the tent and opening the bags has necessitated the use of the bare hands in a measure, and handling these articles, colder than frozen mercury, is like handling hot iron which burns and cracks men's fingers and hands. The comparatively light work, too, has checked the perspiration, and with stiffening clothing and half-frozen fingers the travellers, other than the cook and commissary sergeant, sit down; and, carefully brushing the snow from their garments, loosen the lashings and take off overalls and foot-gear. They systematically arrange these in the shape in which they can easiest don them, for in five minutes after they are frozen solid. The feet are stripped bare and a pair of fresh socks, warm from the man's breast, are put on and covered at once with a pair of large dog-skin or sheep-skin sleeping-socks. Crawling into their bag their chilled limbs gradually thaw out the frozen skin, and later they acquire warmth when hot tea and stew come to them.

The cook meanwhile has obtained his ice, both for morning and evening meal, and has received from the sergeant the carefully measured allowance of alcohol, which he takes with a dubious shake of the head, as he sees how small the quantity and how much work it is expected to do. His ice cut too coarsely or mixed with too much snow, and the wicks half an inch too

high or too low, and the result is a stew mixed with ice, or tea just steaming and uncooked.

The rations, arranged at the station, are served out with the same careful exactness. An ounce too much to-day means shortage to-morrow. The cooking apparatus carefully placed level on a board, he watches it with the utmost caution, for the arrangement is such that carelessness, or perhaps the sudden movement of a man in the bag, may cause a pot to tip and the precious allowance, or a part at least, to be lost. An hour is a moderate time in which to cook the tea, and as the frozen, wretched cook watches it he realizes too keenly the truth of the adage, "A watched pot never boils."

If he has inexperienced comrades they sit up and watch with or aid him, some through a feeling that they must bear a hand, and others because they deem it unbefitting soldiers that their meals should be served them in their beds. They do not realize, until taught by bitter experience, that it is best that all this hardship and suffering should be avoided by all save the cook, and the strength of the party thus be conserved.

The pot finally boils, and instantly it is served to the weary men; some of whom, overcome by the exhausting labors of the day, have dropped off into a sleep, and are doubtful whether to be vexed or pleased that they are recalled to a sense of cold and weariness. The steaming tea and stew are served, the clouds of vapor change to falling snow; the weary men, refreshed by their meal, crawl down in their bags, to be followed by the cook as soon as he can arrange his lamp and pot and tie up the tent securely.

The night, or rather the hours set for sleep, passes slowly. Crowded two or three into one bag, all must be awakened and turn together whenever cramp or cold renders one so uncomfortable that he must change his position. Stiffness, aches, rheu-

matic pains, cold, and cramps fall to every one's lot to a greater or less extent. Nobody is sorry, save the cook, when the officer calls that unfortunate person, whose only comfort is the reflection that his service passes with that meal, as the cooking is done in turn.

In the morning the same routine is gone through with, modified at times by some depraved article of footgear, which, frozen into metal-like hardness, will not be coaxed or forced on to the foot until it has been taken literally to one's heart and thawed out by the heat of the body. The slowness with which the party breaks camp makes everybody wretched and ill-humored until a short hour's march has thawed travelling gear and human nature into tractable mood.

With the temperature 75° (-40.7° C.) or more below the freezing point of water, it seems to me surprising even now that men can ever do and endure such work and exposure. Only those of perfect health, iron constitution, and marked determination are capable of continued work under such conditions. This account of a march and camp is a fair description (underdrawn if anything) of the experiences of a sledging party favored by fine weather and ordinary travel. When storm and snow come to blind, wet, and buffet the wretched travellers, their miseries cannot be described in words. Such conditions as above must be imagined as the common experience of all Arctic travellers until zero temperatures (-17.8° C.) come with May, bringing other discomforts not much less serious.

On the morning of March 16th, the temperature, which had fallen during the night to -44° (-42.2° C.), had risen to -40° (-40° C.), but a brisk northeast wind rendered travel dangerous. At 9 A.M., however, the wind subsided somewhat, and Sergeant Brainard decided to start. His journal says: "Last night Schneider was very lame, and complained of rheumatic

pains and inability to sleep. He was a very indifferent traveller during the entire day. This morning he complains bitterly of the condition of his legs, and is scarcely able to walk about the tent. His condition is so much worse that I consider it the most prudent course to send him back to Depot 'B,' accompanied by Biederbick, who is a capital nurse."

Owing to diminished force, about two hundred pounds were left at this camp, including a day's rations for the return journey. Light drifting snow obliged them to encamp about five miles from the Greenland coast. Sergeant Brainard says: "We fortunately travelled all day over the same palæocrystic floe as yesterday. Our tent is now pitched in a sheltered position, which screens us from the heavily drifting snow, but does not help us with regard to our greatest foe,—the low temperature, which, though at one time as high as -33° (-35.1° C.), has fallen again to -39° (-39.4° C.)."

The morning of the 7th was clear and calm, with a minimum of -43° (-41.7° C.). Says Sergeant Brainard, "Seeing that it is impossible to reach Newman Bay within the time allotted me, owing to the greatly reduced strength of the sledge-party and the increasing roughness of the ice, I decided to leave our tent standing, and to transport the boat and supplies to Depot 'E,' established by Dr. Pavy a few days before in the Gap. That done we would return to Fort Conger."

A little over four hours' travel brought them to the cache. Brainard continues: "We placed the boat beside a huge rock and fastened her down securely with boxes, rocks, etc., first placing hard bread, medical knapsack, etc., under her to prevent them from being blown away. We began the excavation of snow-house, but the increasing wind compelled us to abandon the work and seek our own safety." They were none too soon, for "the storm meanwhile increasing in violence obliterated entirely our

trail at times, and prevented us from seeing more than a few yards in advance. The wind was fortunately at our backs, but frequent frost-bites of noses and cheeks were experienced before we reached the tent, in an exhausted state, after nearly eight hours' absence. 5.30 P.M.," says the field-journal, "we are now sitting in our sleeping-bags, with all sleeping-gear on, receiving hot chocolate from the cook. We congratulate ourselves on reaching the tent as we did, for the wind has increased to a gale, and the air is so full of drifting snow that objects a hundred yards distant cannot be distinguished. St. Patrick was honored this evening by a few songs from 'The Wild Irishman.'" Singing songs when sheltered only by a light tent from a drifting gale and a temperature lower than -40° (-40° C.) was a fair sample of the indomitable spirit and unvarying cheerfulness of the men of the Lady Franklin Bay Expedition.

On March 18th, the morning temperature of -43.2° (-41.8° C.) rose before starting homewards to -41° (-40.6° C.). After six hours' travel camp was made, in order that a few hours' work should be devoted to collecting at that point some scattered stores near by. The drifting snow of the preceding day had forced itself into their travelling-gear, and Sergeant Brainard says: "Our buffalo sleeping-bags are so badly frozen that at this camp the men were compelled to thaw themselves into them or go without sleep. They chose the former evil without giving it much thought, and passed a most wretched night in consequence." The next day they reached Depot "B," where Schneider and Beiderbick were found in good condition. On the 20th they returned to Fort Conger thoroughly worn out, but in excellent spirits.

This sledge journey was a remarkable one, and exhibited not only Sergeant Brainard's executive ability and good judgment in a strong light, but also proved the mettle and strength of the

general party. This journey involved an average daily march of about seventeen miles for six successive days in a mean temperature of -41° (-40.6° C.). Notwithstanding the inability of one man to withstand the hard work in such extreme cold, the trip was successful; and all, including Schneider, returned well, though troubled with slight frost-bites.

The lowest mean temperature experienced by McClintock in his ten sledge journeys was -30° (-34.4° C.), when in twenty-five days he made, with a dog-team, the same average distance as this party, and at a correspondingly early time of the year.



Devil's Head (The Bellows Valley).

[June, 1882.]

CHAPTER XV.

NORTHWARD OVER THE FROZEN SEA.

(DR. PAVY'S NORTHERN JOURNEY.)

A FEW days later Dr. Pavy was sent northward in an attempt to reach land to the northward of Cape Joseph Henry. From his experience gained along the Grinnell Land coast the preceding autumn, he was convinced that he would be able to proceed a long distance northward over the Polar Ocean, and was confident that land would eventually be discovered in that direction. While doubtful of the existence of land to the southward of the eighty-fifth parallel, I considered it important that no chance of geographical success should be neglected, and consequently assigned one of my dog-teams to Dr. Pavy for this special work. He was given the services of Sergeant Rice, the photographer of the expedition, who had also volunteered for the trip, and Eskimo Jens Edward. These two men, selected by Dr. Pavy as his assistants, were gifted with remarkable physical powers and such aptitude of resource as particularly fitted them for the work.

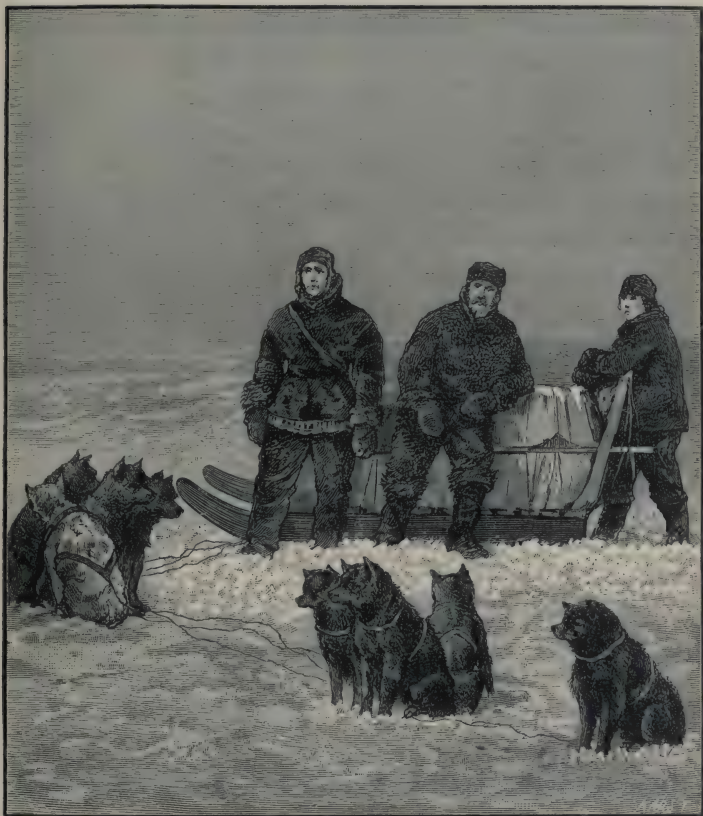
The most important clauses of my instructions to Dr. Pavy read: "The details of your journey and the route to be followed northward from Lincoln Bay are left to your judgment and arrangement. I deem it important, however, to invite your especial attention to the route across Feilden Peninsula and James Ross Bay to Cape Hecla. While overland travel is

usually objectionable, the experiences of the English expedition, 1875-76, as well as that of your own journeys, indicate that travelling is thus facilitated when the party can avoid any considerable distance of the polar pack. . . . 4th. You are to bear in mind that in no instance must your party be separated ; that the exact location of depots must be made known to each member ; that no advance must be made beyond such time as, on full allowance, one-half of your provisions have been consumed ; and that in case of any considerable movement of the ice, or on the appearance of any lanes of water, you must at once seek the main-land. . . . 6th. In case no land is reached, one day must be devoted at your most northerly point to determining your position with the greatest care, and in obtaining detailed information as to the depth of the sea, the temperature of the water, the tidal currents, the thickness of the new ice, and any other available data. Whenever you are obliged to rest your team a day, similar observations should be made. . . . 9th. A careful lookout will be kept for drift-wood, and if any fragments that could possibly have belonged to a ship be noted, it must be brought to the station . . . for identification. It is possible that some tidings of the Jeanette may thus be obtained. In accordance with your wishes, no special anxiety will be felt for your party until June 1st. Trusting that your earnest enthusiasm for polar exploration, united to your practical experience, . . . will insure all possible success, and wishing beyond all your safe return, I am, etc."

The party left on March 19th with a team of excellent dogs. It seemed to me, then, an excellent opportunity of ascertaining the capabilities of a dog-team, by noting the constant weights of the sledge, the weight of the dogs on going and returning, and the food issued to them daily. Through a misunderstand-

ing of my instructions the dogs were not weighed after returning, nor were the constant weights determined.

Dr. Pavy's team had been used for the purpose of facilitating



Dr. Pavy's Party Starting North, March 19, 1882.

[From photograph by Sergt. Rice.]

Lieutenant Lockwood's work on the North Greenland coast, and to assist this section Sergeant Jewell was in turn detached, with the dog-sledge Antoinette, driven by Eskimo Christiansen, which was to serve as a supporting sledge as far as Lincoln Bay, where

the remains of the English depot of 1875 served as a base for Dr. Pavy's subsequent operations. Sergeant Jewell, on his return, was to bring south to Depot "B" two hundred pounds of Australian beef and certain small stores.

In order that Sergeant Jewell might carry as large a load as possible, he was provided with no tent, but was directed to avail himself at Depot "B" of the snow-house, and while journeying from that point to Lincoln Bay and return he was to shelter himself by snow-house or "dug-out."

The party left in a temperature of -25° (-31.7° C.), and the trip northward was comfortably made in about that mean temperature, although while at Depot "B" a temperature of -41° (-40.6° C.) was recorded. From Cape Beechy to the north side of Wrangel Bay the ice was largely rubble and rough hummocks, which made progress slow and tedious, and necessitated three days' journey where two had been estimated.

Sergeant Jewell left Lincoln Bay for Depot "B" on the 23d, having been furnished with but one hundred and sixty-four pounds of beef instead of two hundred as ordered in writing. His journey southward was made under very trying conditions and in very low temperatures. On leaving Lincoln Bay the temperature stood at about -40° (-40.6° C.), but fell steadily during the day, and registered -53° (-47.2° C.) during the night. He was fortunate in finding large snow-drifts just south of Wrangel Bay, where he passed a tolerably comfortable night in a snow-hut. The following day, travelling in temperatures which ranged from -45° (-42.8° C.) to -49° (-45° C.), he reached Depot "B," where orders had been sent him to carry out instructions from Lieutenant Lockwood regarding the transportation of stores from Depot "B" to the Greenland coast.

From March 25th to 30th Sergeant Jewell, assisted for a portion of the time by Private Ellis, was engaged with his

sledge in accumulating stores on the Greenland coast. There was no day on which the temperature did not fall as low as -40° (-40° C.), and on four days -50° (-45.6° C.) and -51° (-46.1° C.) were recorded. The mean temperature in which this work was done was about -40° (-40° C.).

On March 27th Sergeant Jewell was deprived of the services of Private Ellis, who, when sent to aid him from the home station, to Depot "B," had unfortunately wet his feet from tidal overflow during the journey. Not exercising the proper precaution of changing his foot-gear, Ellis' imprudence resulted in his being seriously, though superficially, frost-bitten. Notwithstanding his condition, he made a journey, March 25th and 26th, from Depot "B" to the Greenland coast and back, and then, in order not to interfere with the work, insisted on Sergeant Jewell permitting him to return to the station alone. Private Ellis showed remarkable fortitude and determination during the whole affair, which was especially creditable to him.

On the 30th, the barometer having fallen below 29.00 and fearing a violent storm, Sergeant Jewell prudently concluded it best to return to the station, rather than to venture another trip to the Greenland coast.

In the performance of this extraordinary work Sergeant Jewell showed an endurance and fortitude which surprised many, as his physique was but medium. He justified every confidence placed in his faithfulness, energy, and judgment then and afterward. He crossed Robeson Channel six times during March, and ten times during his service—more frequently than any other member of the expedition, except Eskimo Christiansen.

In connection with his own trip to Lincoln Bay, Dr. Pavy reported that north of Cape Beechy the ice-foot became so encumbered with grounded floe-bergs that his party was com-

pelled to take to the floe-ice, notwithstanding its difficult character. On leaving the shore they passed footprints of recent origin, made by a well-grown bear who was travelling south.

Dr. Pavy passed his cache in Wrangel Bay without visiting it, but proceeded to the depot near Mount Parry, on reaching which the tracks of the bear were again fallen in with. The bear had evidently stopped for lunch, and had shown discrimination in his selection of the food. The sacks of bread had been torn open, and the bags torn into shreds, but the bread was left untasted. The pemmican covering had been stripped off, and about two-thirds of it (some seventy pounds in quantity) had been eaten.

After Sergeant Jewell left, on the 23d, a comfortable snow-house was built, to serve as their headquarters until the last load of provisions to be used in the northern trip had been carried beyond Black Cape.

At this camp Old Sneak—one of the team—displayed his faculty for avoiding work. When in harness he did his duty, for he well knew that Jens' keen eye was on him, and that his slackened trace would be followed by the driver's lash, thrown with such force and precision as to make the thick fur fly from any selected spot. When the food had been given out Sneak was on hand, as always on similar occasions, but the loaded sledge with the team in harness waited on him alone. A thorough search failed to find him, and fearing that some article left behind in the snow-hut might suffer from him, Jens entered the house to secure the food, and there found the truant quietly awaiting their departure.

On March 24th, having perfected his arrangements, Dr. Pavy started north, but a southeast breeze with a temperature of -36.5° (-38.1° C.) drove the party to camp near Cape Union, where they were storm-stayed for twenty-two hours.

Dr. Pavy expressed the opinion, that in the vicinity of Cape Union, owing to the escarpment of the cliffs, the coast could never be practicable for fall travelling, as in places dogs could not travel, and in others the conditions were such as to be impracticable even for men. Three times in one day his party was driven from the ice-foot, and once was compelled to lower the sledge by the dog-traces over a high and perpendicular ice-foot. Though the ice was level in most places, yet a thin crust of snow, mixed with the salty efflorescence from the sea-ice, impaired the progress of the party by the extreme friction it caused the sledges.

At 3 P.M. of the 25th the temperature moderated to -27° (-32.8° C.), and enabled them to resume their journey, but the ice was found exceedingly broken and uneven, and in one place for a hundred yards the sledge and load had to be transported by hand.

In connection with this day's journey Dr. Pavy says: "I will farther say, that to my belief the Eskimo are indispensable for extended sledge journeys. Their experience in managing dogs, and the apparent facility with which they can drive at once over difficulties where the best of their inexperienced Caucasian pupils will fail or labor for long hours, put the usefulness of their services out of the question. Moreover, their endurance to cold will allow them to perform the many duties of a driver with bare hands, and in half of the time that it would take to freeze ours. The history of Arctic work, from Wrangel to this day, will bear witness to the fact that all dog-sledging expeditions that have used natives as drivers, or perhaps their best substitutes (I mean men trained for years to the work), have succeeded with comparative ease. I think that Sir George Nares, on his homeward journey, must have reflected more fully on the usefulness of dogs and their drivers."

I can scarcely concur in the ideas thus put forward by Dr. Pavy in his official report. My opinion in this respect was also shared by Lieutenant Lockwood and Sergeant Brainard, who made the only successful explorations with dog-sledges during our two years' services. The utility of the Eskimo dog as an Arctic draught animal is beyond doubt; an opinion in which I am sure Sir George Nares and his experienced officers will heartily concur. But when it is stated that the Eskimo is indispensable for extended sledge journeys, I must thoroughly dissent. The valuable Arctic papers for the expedition of 1875 contain the opinion of Baron von Wrangel "On the best means of reaching the Pole," in which he advocates the employment of dogs "and active and courageous drivers." The note attached to that paper, whether Wrangel's or the accomplished editor's, well says that success would be doubtful with Eskimo or Tchouktschi drivers—men without courage or activity. Our Eskimo drivers could not be excelled in their race for bravery, energy, and activity, but Lockwood and Brainard would never have reached their farthest point had they depended on the courage and activity of their dog-driver, whom it was needful to incite to continued exertions. This is no reflection upon the courage of these men, who are unable to appreciate the object of these journeys, and who are necessarily depressed on outward marches owing to the diminishing supply of food, which to them forbodes hardships and sufferings, if not dangers.

The most perilous and remarkable sledge journeys in connection with the British expedition of 1875 and 1876 were made without the aid or assistance of Eskimo drivers. At the very point where Dr. Pavy's party was then struggling, and under similar unfavorable ice conditions, was made the memorable sledge journey, March 12 to 15, 1876, in which those heroic officers, Lieutenants Rawson and Egerton, R.N., dis-

played such fortitude, endurance, and unselfish energy in their efforts to save the life of a Danish dog-driver from the Greenland settlements. These young English officers gave of their heat and life to save this denizen of an Arctic coast. Later the same officers, with no Eskimo, but with British sailors, made successfully, in temperatures as low as -42° (-41.1° C.), the trip from Floeberg Beach to Discovery Harbor and back in ten sledging days—journeys which compare favorably with our own successful work.

In our own expedition the successful raising, breaking, and training for field services of our Eskimo dogs born at Conger were due to the intelligent and zealous efforts of Private Schneider, who, after an experience of several months, drove nearly as well as an Eskimo.

The ability of the Eskimo to endure privation and hardships has been greatly overrated. Successful resistance to conditions of cold and privation by men is not so much a matter of race and original habitat, but depends to a greater extent than is usually acknowledged upon the moral force and mental determination of the individual. The subsequent experience at Cape Sabine in the case of Eskimo and Caucasian, with the same food and in pursuit of the same object—game or relief for the party—instances this. In the trip toward Littleton Island Sergeant Rice returned in fair physical condition, while Eskimo Jens was completely exhausted. The same relative difference in their condition was noted between Sergeant Long and Eskimo Christiansen on their return from the unsuccessful hunt for game in Alexandra Harbor. Another illustrative instance between Rice and Jens occurred in this very trip of Dr. Pavy's.

The 26th to 28th were occupied in the moving of a second load from Lincoln Bay to Black Cape, the party experiencing temperatures from -11.5° (-24.2° C.) to -44° (-42.2° C.), and

on the 29th reached Lincoln Bay again. The first glaze on the snow from the heat of the sun was noted on the 28th, the highest temperature noted having been -11.5° (24.2° C.), and on the 29th the party discarded their *jumpers* as too warm while travelling. On March 30th the temperature, which had stood at -52° (-46.7° C.) the previous night, rose to -8.5° (-22.5° C.). As a severe storm with drifting snow prevailed, the party remained comfortably in the hut during the day, improving the delay by drying and repairing their boots and clothing.

On the evening of March 31st the party, in a temperature of -38.8° (-39.3° C.), left Lincoln Bay with its last load northward, and when within a short distance of Cape Union the right runner of the sledge broke longitudinally through the lashing holes. Sergeant Rice offered to return to Conger for a new runner, and started at once, accompanied by Eskimo Jens; the temperature then being -42° (-41.1° C.). They took a small spirit-lamp to melt ice with, a small quantity of preserved meat and chocolate for a lunch, and also the steel shoe of the runner. The journey was made to Depot "B," about four miles south of Cape Beechy, in one march. Between the cape and depot Rice says that Jens, for whom he had repeatedly stopped, was so exhausted that, despite all persuasion, he was obliged to stop within a few hundred yards of the depot, and he reached that point fifteen minutes after Rice's arrival. Sergeant Rice modestly said: "Doubtless Jens' exhaustion was due to the greater exertions he made, and worry he had undergone in getting the dogs, with broken sledge, back to Lincoln Bay, for I am sure that his powers of endurance are greater than my own." The march from Lincoln Bay to Depot "B" occupied nineteen hours, and involved at least forty miles' travelling, and possibly farther, owing to the extremely tortuous path they were obliged to pursue. The party reached

Conger on the 3d, at 7 A.M., and, being furnished with a new runner, left on the 4th.

The presence of Lieutenant Lockwood enabled me to send the runner to Cape Beechy, relieving Rice and Jens thus far, but beyond that point they were obliged to carry it. In returning, the trip was made from Depot "B" to Lincoln Bay in nineteen hours, they following the inside route by the way of Wrangel Bay, where the depot of provisions left the previous autumn was found in good condition, unvisited by the bear.

Dr. Pavy, during the absence of Rice and Jens, travelled a short distance inland over the high hills to the westward of Lincoln Bay, in the hopes of discovering whether an inland route could not be found which would allow a party to travel at any time from Wrangel Bay to Floeberg Beach.

Dr. Pavy says: "At the highest point reached, which I estimated to be about two thousand feet, I had a magnificent view, especially overland. From the head of Lincoln Bay several valleys could be seen, which, succeeding to each other, appeared to lead toward Wrangel Bay. In another direction, northeast, I could distinctly see a succession of sloping hills cut with ravines and valleys. I think it is possible to reach the coast at the entrance of some of the numerous openings near Floeberg Beach." Between the United States range and a lower chain of mountains nearer to the coast, Dr. Pavy thought it probable that a long and extensive valley existed trending from the northeast to the southwest.

Lincoln Bay was finally left on the evening of April 6th, the party selecting night travel, as was generally recommended to field parties. High winds drove them to camp part of the 7th and until the evening of the 8th, when on starting, "the wind," Dr. Pavy says, "was blowing such a gale that in places, over good ice glazed by snow, it pushed the sledge faster than the

dogs could run." On this day the temperature rose to $+4.8^{\circ}$ (-15.2° C.), being the same day on which the temperature was first observed to be above zero at the home station.

The party was delayed by high winds on the 10th, which drove them to camp, and on the following day the rough and difficult ice obliged them to move their load by hand nearly a thousand yards. The temperature was so mild on the 10th that Rice and Jens slept out-of-doors, though Dr. Pavy occupied the snow-house.

The Alert winter-quarters were reached on April 11th. Of the approach Dr. Pavy says: "A heavy lead-colored sky, contrasting fearfully with the whiteness of the freshly drifted snow, lent to the surrounding landscape a gloomy appearance. From a distance we could see a large cairn on top of the Alert's lookout, and lower, on the brow of a smaller hill, some dark object, which at first we took for a cache, but was soon found to be the tomb of Petersen. Beneath the large stone that covers the remains of the Danish interpreter a hare had taken up his residence, strangely associating the fact of his presence with the words of the epitaph engraved on a copper plate at the head of the tomb, 'He shall wash me, and I shall be as white as snow.'"

From the lookout hill at the Alert quarters, as far as could be seen, the pack consisted of crowded masses of rough and hummocky ice similar to that described by the officers of the Alert. Dr. Pavy was of the opinion that the ice in that neighborhood had broken up and that the coast-water had been possibly navigable the preceding autumn, but at great risk and danger.

Referring to the grounded bergs, which in 1875-76 protected the Alert from the destructive pressure of the polar pack, he says: "This spring no floe-berg could be seen around the place where the Alert must have dropped her anchor in

1875. No signs of palæocrystic ice were observed closer than about a mile and a half from the coast."

The temperature then was above zero (-17.8° C.), and for them, heavily clothed, the weather was so warm that when travelling, even in shirt-sleeves, they perspired freely.

Referring to the cairn at the Alert winter-quarters, Dr. Pavy says: "About five feet from the ground a large iron cylinder, sealed probably by the engineers of the ship, and in which are secured the documents of the British expedition, is so firmly held by an enormous weight of stones that it would be necessary to tear down half of the monument to get at its contents. . . . We contented ourselves with leaving our record in an air-tight rubber match-box, well secured with heavy rocks by the side of the English documents." The party were impressed by the thick body of snow which covered the surrounding country, in marked contrast to the ground in the vicinity of Conger which was scarcely concealed. The signal flagstaff, with attached halliards, at Cape Sheridan, was still standing in as firm a condition as when erected in 1875.

The danger of travelling along that coast was instanced by the fact that on returning to Black Cape for a second load of stores, not only were the provisions scattered around several hundred yards from the point where they were cached, but the ice-foot was covered with many stones which had fallen from the cliffs during a violent gale, and on the place formerly occupied by their tent several heavy blocks of slate were lying. Dr. Pavy says: "From Cape Union to Floeberg Beach parties travelling during the windy days are continually exposed to the fall of stones from the ragged and disintegrating tops."

The ice continued as a palæocrystic pack from Cape Sheridan to Harley Spit, and thence to View Point, so that following a direct course they found good travel generally, though deep

snow softened by the sun at times impeded their progress. View Point was reached on the morning of the 15th, and Dr. Pavy says he was then "more fully supplied (with stores) than I had expected to be when leaving Fort Conger." The party for a couple of days were favored with calm, beautiful weather and high temperatures. At Conical Hill, on the 16th, many traces of musk-oxen, and fresh tracks of the lemming, ptarmigan, hare, and fox were observed.

From a high hill in Feilden Peninsula the ice in James Ross Bay was seen to be in good condition. My instructions to cross Feilden Peninsula not being mandatory, Dr. Pavy decided, on account of the bare ground in some places and soft snow in others, to follow the coast to Cape Joseph Henry. This decision, though it seemed wise at the time, eventually proved fatal to the success of the journey, as had James Ross Bay been crossed, and the land quitted in the vicinity of Cape Hecla, six miles north of Henry, the party would probably have avoided their polar drift, which resulted in the loss of the greater part of their stores and the complete abandonment of their expedition.

These remarks are made not to reflect on Dr. Pavy's judgment, which doubtless caused him to select the route apparently the easiest, but to emphasize the great importance of following, as far as practicable, a land route, so that the broken and distorted ice of the Polar Sea may be avoided as long as possible. My opinion entertained then still holds, that to the northward of Capes Hecla, Columbia, or May the ice of the Polar Sea is not as rough and broken as in the entrance to Robeson Channel between Capes Joseph Henry and Bryant. Dr. Pavy remarks of the country near View Point, that it presented numerous signs of animal life, and more abundant vegetation than in any other place seen by him north of Discovery Harbor.

Level new ice afforded excellent travel from View Point to

the neighborhood of Cape Joseph Henry. The character of the palæocrystic ice from Harley Spit to Conical Hill was set forth as consisting of: "Circular, nearly level floes of small dimension, the largest perhaps a mile and a half in extent, at the edges of which was a fringe of bergs and hummocks. Between them were ditches or crevices from five to fifty yards wide, which must have been at some time filled with young ice. These hollows, originally from three to seven feet deep, were now shallow, and in places nearly filled with a mixture of fresh-water ice and frozen snow." These floes showed the powerful influence of the polar sun for several summers, and "in every place where the recently fallen snow had blown off the ice was fresh and good for cooking."

Near Cape Joseph Henry the new ice showed that when the sea closed the preceding autumn a belt of open water, free from heavy ice and at least two miles in width, extended along that coast. To the northward of Cape Joseph Henry, however, it decreased in width, and ran along the coast to the westward toward Cape Columbia as a very narrow strip.

During the 18th and 19th of April a severe storm prevailed, which confined them to their tent, the temperature varying from -5.5° (-20.8° C.) to -12° (-24.4° C.). There is but little doubt that this storm had a marked influence in the disintegration of the polar pack which occurred a few days after.

During the 20th and 21st the party succeeded in transporting their stores to a point on the polar pack about four miles north of Cape Joseph Henry, but were forced to desist from their work by a violent storm from the south-southeast on the 21st, which continued as a severe gale during the night, the wind being estimated at forty miles from the southeast.

At that point they had, from a high floeberg, an excellent view

of the polar pack, the appearance of which was discouraging in the extreme. "East of the line of massive cliffs of Cape Joseph Henry the Polar Sea was of such rough appearance that no sledge, even lightly loaded, could have made any progress over its disordered surface. It was nothing but an inextricable maze of huge bergs and enormous hummocks, piled up in a similar manner as when travelled over by Commander Markham. Directly north of Cape Henry and a certain distance from us, perhaps three or four miles, the confusion of the ice was the same, discouraging in its compactness." To the northeast this line of thick-ribbed ice "also prevailed, but to the northwest and due north of Cape Hecla seemed to be of a less ponderous character." Indeed, the conditions were so favorable that the route in that direction was determined on; as, "besides the advantage of stumbling over a less dense pack, we could also add the advantage of establishing a depot (at Cape Hecla) for our return," and of determining the exact route after "a good view from the summit of the high cliffs of Hecla."

On moving northward on the 23d, Eskimo Jens suddenly called out "Water!" which Dr. Pavy thought to be a false alarm; but a half hour brought them to a point where, from a high berg, was seen extending "to the coast (toward Cape Hecla) an open channel a mile wide, in which floated small and rare pieces of ice. For three or four miles—as far as the perspective allowed—the eye could follow them. Here, on account of the convexity of the floes, the line of water seemed to close at the entrance of James Ross Bay against a margin of ice, and about the meridian of Crozier Island. To the west this opening increased in width past Cape Hecla, extending as far as we could see from hummocks thirty feet high. From the side of the pack where we stood, following the edges of our floes and several larger ones above, it took a more northerly direction. Here again, as to the

southeast, a convex curve of the pack . . . closed to the view its northern extension." Eskimo Jens, notwithstanding their critical condition, was greatly delighted and much affected by the appearance of a fiord seal (*Phoca hispida*), without doubt the most northerly seal ever observed.

As Dr. Pavy had left his compass behind in the tent, he could not determine the movement of their floe except with reference to marks on the shore, but it was evident later that the pack was moving to the northward into an open portion of the Polar Sea, as new lines of coast gradually opened to the westward, including three capes, the farthest of which was thought to be Cape Columbia. To the east and northeast, at a considerable distance, Eskimo Jens declared there were unmistakable signs of open water. Such a condition of the ice indicated clearly a marked disintegration of the polar pack, and in case of a severe southerly gale and large water-spaces to the northward the situation would have been critical. Dr. Pavy believed that the water did not extend farther than the coast of Feilden Peninsula, and that the pack was still touching Cape Joseph Henry; an opinion to which Eskimo Jens objected, claiming that water extended along the coasts of James Ross Bay and Feilden Peninsula.

This state of affairs, as well as the limiting clause of Dr. Pavy's orders, prevented him from attempting to proceed northward over the disintegrated pack. He consequently decided to return at once to Cape Joseph Henry. Taking only indispensable effects, and sufficient provisions to feed the party for a few days, they started in haste for the cape, but on arriving opposite it, found open water of three-quarters of a mile in extent between them and the land. On returning to their old camp for some farther stores, the water-space toward Cape Hecla was found to have increased in width to about three miles, while the water-

clouds to the north and northeast had increased in amount and distinctness.

The farthest latitude attained by this party is given by Dr. Pavy as $82^{\circ} 56'$, it being estimated, as no observations for time, magnetic declination or latitude were made at any period during his absence.

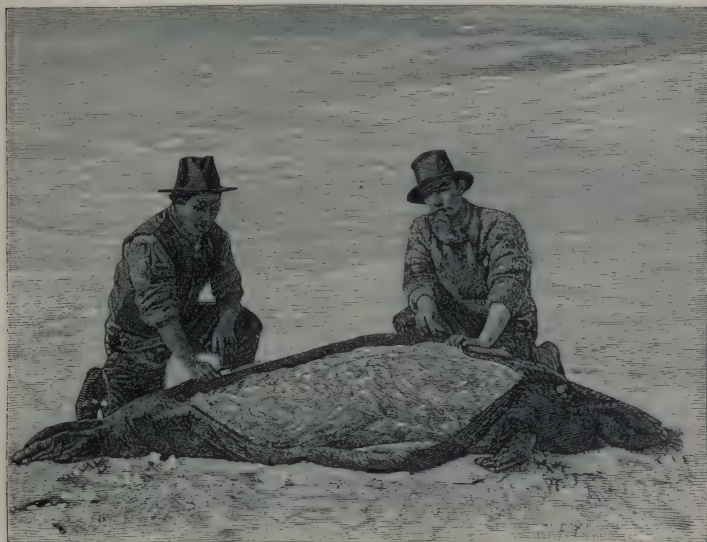
Dr. Pavy then thought of reaching land, and, travelling westward for fifteen days, of endeavoring to extend Lieutenant Aldrich's explorations to the southwest.

A grinding, roaring noise, indicated that the pack was crowding against the lower coast, and in consequence, the sledge was hastily loaded with the most indispensable effects, and with food enough to enable the party to reach Harley Spit. Abandoning his tent, provisions, and part of his scientific instruments, Dr. Pavy succeeded in reaching Cape Henry, where the pack was grinding against the high, perpendicular ice-foot. The pack stopped motionless against the shore, which enabled them to scramble successfully over the rough, high floebergs which made the ice-foot almost inaccessible. At the edge of the ice-foot it was necessary to unload, and hoist the dogs and articles over its vertical edge.

Dr. Pavy concluded it would be unwise to return for the articles abandoned, as the pack was liable to move northward again, since in the offing it was drifting south. He immediately started southward, impressed with the idea "that Robeson Channel was open, and that great haste was necessary," fearing that the ice toward Cape Sheridan would also break up and seriously delay their progress homeward.

At noon, April 24th, the party camped at View Point, where a record was left in the old English cairn, and in the evening of the following day they reached Harley Spit. At 7 A.M. of the 26th the party was again in the snow-house at Black Cape.

“From Cape Sheridan, south of the palæocrystic pack, the ice was broken, in motion, and in many places separated by large lanes of water.” The next morning the wind blew from the south, and caused an opening to the north of Black Cape “between the solid ice of Robeson Channel and the loose floes above—a space of about a mile wide, and of which the transversal end disappeared



Dr. Pavy and Jens Skinning Seal.
[*Fort Conger, May, 1882.*]

two or three miles from the coast.” The party, however, travelled southward over solid ice to Lincoln Bay, where for two days an effort was made to find an inland route between that and Wrangel Bay, which probably failed through their going too far to the west and north. The party was favored with excellent weather, with no wind and high temperatures, from this time forward.

Depot “B” was reached on May 1st, and the following day

the party arrived at Fort Conger, having the same excellent health during their arduous journey of six weeks' duration they had always enjoyed. Rations of lime-juice were daily issued during their outward journey, until the supply was abandoned on the pack, and their field-ration proved sufficient for the maintenance of their strength and health.

Dr. Pavy commended the intelligence, judgment, and perseverance of Sergeant Rice, and the efficiency and faithfulness of Eskimo Jens Edward.

Despite steady and unremitting labor and the possession of health and strength, this attempt to travel over the Frozen Sea failed through natural causes; but, as Dr. Pavy says, it "determined the important fact that last fall open water could have been found as far as Cape Sheridan, and from Conical Hill perhaps to Cape Columbia; and proved, by our experience, that even in such high latitudes the pack may be in motion at an early period of the year, perhaps at any time. I am firmly convinced that, but for our misfortune in finding open water, we could, without greatly distancing Commander Markham, have reached perhaps the latitude of 84° N."

In speaking of the rough character of the ice of the Polar Sea, Dr. Pavy does justice to the courage, endurance, and energy of his gallant predecessors: "If such was the ice over which the British dragged heavy loads and cumbersome boats, instead of being astonished at the small distances daily travelled, on the contrary I sympathize with them in their sufferings, admire their perseverance, and applaud heartily their pluck and gallantry." He farther states his belief that Commander Markham in no way exaggerated his hardships, an opinion, it is hardly necessary to say, which is shared by every person who has ever seen palæocrystic ice or known the trials of Arctic sledging.

CHAPTER XVI.

CHANDLER FIORD.

I HAD long considered it possible that the interior of Grinnell Land could be penetrated successfully; that the land itself was of limited extent, and that it could be readily crossed. This opinion was clearly set forth in my instructions to Dr. Pavy at the time of his unsuccessful trip, in September, 1881, into Archer Fiord, whence he was compelled to return by open water. In those instructions I pointed out the experiences of Lieutenant Archer, R.N., in Beatrix Bay, and the comparatively low ground to the southwest of Archer Fiord seen by that officer, as showing the possibility of travel in that direction.

My letter of the preceding September farther said: "The object of your journey is to determine, if possible, the existence or non-existence of the sea or other water to the westward or southward of Mount Neville. It seems to me quite probable that such water exists at no great distance. Lieutenant Archer, R.N., who viewed the country from an elevation of thirty-eight hundred feet, says: 'No single high hill or mountain was visible at any great distance to the westward, while mountain ranges extended northward from magnetic bearings 72° N., and southward from 72° S.' Sir Edward Belcher found islands about three hundred miles to the south-southwestward of that point. Lieutenant Aldrich, R.N., in $85^{\circ} 33'$ W., reported that the coast of Grinnell Land turned south as far as could be seen. These facts, with Sir J. D. Hooker's discovery that 'the vege-

tation of this meridian of the polar area is entirely Greenlandic, showing no more relation than does Greenland itself to the flora of the American polar islands,' argue a land, and especially to the westward, of limited extent."

There were two possible routes, both nearer to Conger than Beatrix Bay, which had been left untried by Captain Stephenson, R.N. ; one by the way of Conybeare Bay, and the other through Black Rock Vale. In order to gain some knowledge as to the practicability of the former route, which was preferred by me as affording travel over the floe, I decided on a preliminary trip.

On April 19th, Sergeant Cross and Private Bender, with a Hudson Bay sledge, left Conger with instructions to penetrate as far into Conybeare Bay as possible, in a journey which should entail an absence of not exceeding twelve or fourteen hours from the depot, established on the shores of Sun Bay. They carried with them, as far as the depot, certain supplies, which were subsequently to be used by any party travelling in that direction. They returned on the 22d, having succeeded in reaching a point in Conybeare Bay opposite to the west end of Miller Island, but, owing to the prevalence of snow and fog to the westward, they had been unable to determine whether the bay extended far in that direction. Travelling in the bay was heavy and discouraging.

Although fully impressed with the importance of an Arctic commander's remaining at his station or ship, the condition of affairs at this time was so favorable that I decided to absent myself for a period of fifteen days. Full instructions were given to Sergeant Israel as to what should be done in case of special contingencies in connection with the sledging parties to the northward.

Fearing the difficulties of inland travel, and believing there was

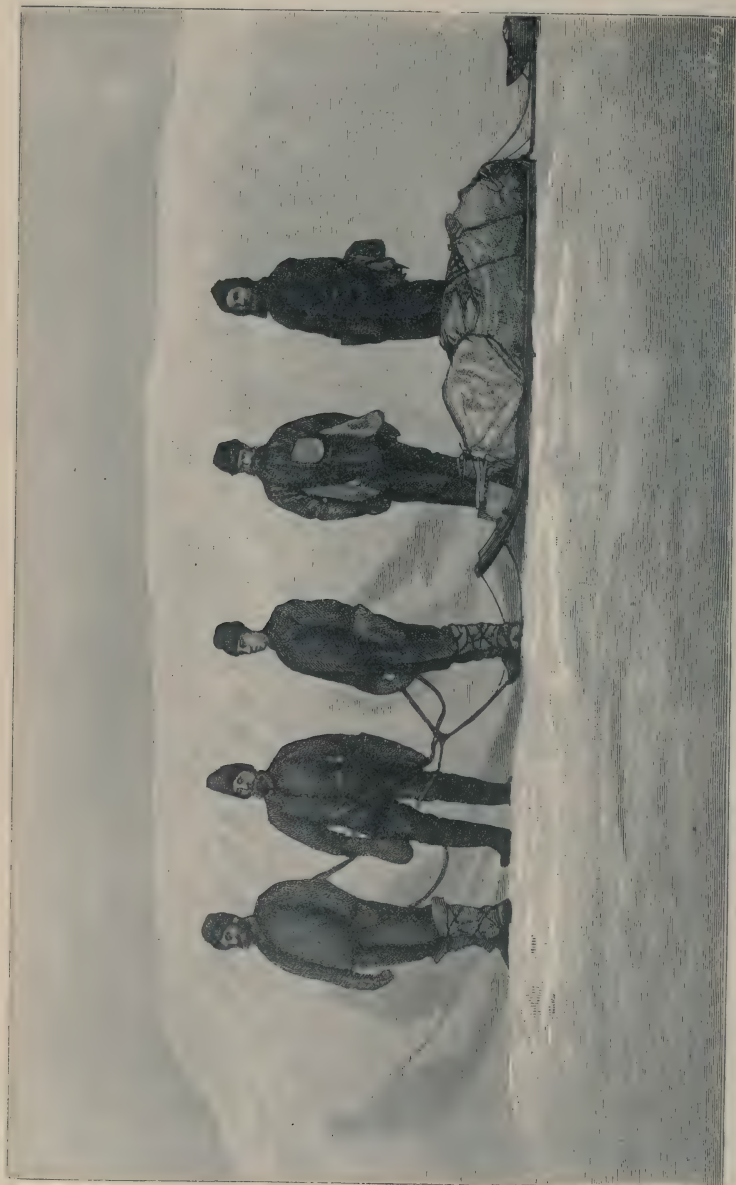
in sledge travel a point at which extra rations became a burden and hindrance, I decided to reduce the weights as far as possible, and to limit my rations to twenty days at the longest. The means of transportation were to be two Hudson Bay sledges, one of which was to be drawn as far as was convenient and then abandoned. The weights of these sledges were not to exceed, with their loads, four hundred and fifty pounds on leaving the depot at Sun Bay, which would be a comparatively light load for myself and the three men, who were to accompany me.

A four-man shelter-tent, after the pattern known during our civil war as the "dog-tent," was made for us, which, complete, weighed about eleven pounds. Our cooking-lamp with its apparatus, including plates, cups, etc., weighed only six pounds, and another light lamp weighing a pound was taken for the use of any man who might possibly be detached.

Privates Biederbick, Connell, and Whisler were selected to accompany me, but owing to Private Biederbick's suffering exceedingly from toothache, he was replaced at the last moment, somewhat against my inclinations, by Bender, who, although exceedingly anxious for field services, had been pronounced by the surgeon unfit for it. In order to save the strength of my party on starting, Sergeant Cross and Private Long were taken one march beyond the depot in Sun Bay.

At 12.30 A.M. of the 26th the party left Conger, the temperature then standing at -7° (-21.7° C.).

At 6.18 A.M. the tent on the shore of Basil Norris Bay was reached, the distance as travelled along the winding ice-foot being sixteen miles. The ice proved to be of excellent character for travel, having recently formed of the overflow of the spring tides from the tidal cracks. The only difficulty experienced was in crossing occasionally from the outer to the inner ice-foot, which, necessitating travel over very rough ice, was



LIEUT. GREELY AND PARTY STARTING FOR EXPLORATION OF GRINNELL LAND, APRIL, 1882.

(From a photograph.)

exceedingly difficult, and resulted in the injury of one of our sledges.

At 9 P.M. that evening we started over the low "divide" to Sun Bay, where we were delayed for a few minutes in an attempt to kill a wolf which was seen near. The gun had been left behind, but we had two revolvers, with one of which Private Connell fired at the wolf without success. We travelled at a free gait and soon rounded Stony Cape, where we for the first time looked into Conybeare Bay. The ice formed from the tidal overflow in Sun Bay afforded excellent travelling, which continued until we passed the several spurs of Stony Cape, when we found the ice-foot very much broken up and in a difficult condition for travel; our sledges continually overturning, at times one man had to hold them right side up.

Private Whisler and myself were dragging one of the sledges, which, being of an improved pattern, did excellent work. The second, Old Veteran, dragged by three men, was of such an inferior pattern as to cause an enormous amount of friction and entailed corresponding exertions to advance it.

At 2 A.M. we stopped for tea, on the complaint of some of the men who were exceedingly thirsty. It may well be remarked here, that during this trip the men who were especially addicted to the use of tobacco seemed to experience thirst to a greater extent than those who refrained from its use. Whether this was a result of the habit, or was a coincidence, I cannot say. The cooking-lamp did not work satisfactorily, and it was an hour and a quarter before we were again on the road.

While delaying for this tea the temperature fell to -14° (-25.6° C.), the lowest experienced by us during the journey. It was my own experience that the suffering from the cold while delaying for this lunch was so marked as to destroy the effects of the tea when obtained. I decided in consequence of

this brief experience that lunches were inadvisable, and that the best plan to follow would be to march as far as was practicable without taking food ; and then, be the distance great or small, to regularly encamp and obtain proper rest and food before proceeding farther.

The surface of Conybeare Bay was covered by deep snow, which was in that most trying condition for a traveller, glazed over by a crust which was just thick enough not to bear the weight of a man, but sufficiently so to prevent walking except by lifting the foot quite above the snow. A short experience of that kind of travelling decided us to quit the snow-covered floe and to follow closely the ice-foot, which, though entailing a greater length of travel, would afford more rapid progress with a lesser expenditure of strength and time.

The ice-foot proved alternately good and bad, until at 6.35 A.M. we camped opposite a gorge which was nearly due north of the west end of Miller Island. What was thought to be a low point of that island extended about half a mile to the westward of us, but this was determined later in the year by Lieutenant Lockwood to be a separate island.

A comfortable camp was made between the shore and a row of forced-up hummocks, which left a level space of snow between them and the high barren cliffs that rose above us to a height of nearly two thousand feet. Between the cliffs proper and our camp was a high ridge of about six hundred feet in elevation, of peculiar form, which had evidently been separated from the main cliffs by the erosion of water and the action of frost. The outlying spur of the ridge was cut off by ravines fully two hundred feet deep, which ran one to the east and the other to the west, leaving a narrow passage-way with high rock-walls on either side. The distance travelled in this march was fifteen miles.

Sergeants Cross and Long, who had been of assistance to us, turned back the following morning from this camp, carrying with them to the depot in Sun Bay a two-man sleeping-bag. That evening, the temperature standing at -4.2° (-20.1° C.), arrangements were made for our farther journey by equalizing, as far as practicable, the loads between the two sledges. We cached at that point one day's rations for our return trip, and also nearly a gallon of alcohol which we feared would be lost through a leak in the tin caused by the overturning of the sledge.

At 9 P.M. we started westward, following closely the ice-foot, which was generally good, taking breathing spells of three minutes for each hour's travelling. At 1 A.M. the temperature sank to -8° (-22.2° C.), with a clear sky and nearly calm weather. At 3 A.M. we reached a point where the shore made a semi-circular bend to the northward, more than doubling the distance to the next point. In the centre of the curve opened up a valley which extended some distance inland. To avoid the long detour by way of the shore, I decided to strike directly across the bay to the next prominent point. On reaching the centre of the bay a second valley was seen running at right angles to the first. From our new stand-point the valley which ran to the north-northwest seemed to extend about fifteen miles, gradually narrowing, while the second, to the east-north-east, soon closed in an abrupt ravine. The two valleys united a few miles from the ice-foot in one broad opening some three miles wide, bounded on each side by high hills.

The travelling across the floe was exceedingly tiresome, owing to the deep snow and thick crust, and, despite several changes of places in the drag-ropes and a number of short rests, the party reached the other side in an exhausted condition. This result sprang partly from the continual breaking through of the

crust, and partly from the extraordinary amount of friction of the Old Veteran.

We reached the coast again at about 4.10 A.M., and immediately encamped. The distance travelled during this march was estimated at sixteen miles.

On examining the sledges I decided to abandon the Old Veteran, being satisfied that its farther retention would materially retard our progress.

While we were at this camp Private Connell visited the mouth of the valley running to the northwest. He found vegetation to be abundant, and reported that during the summer months a river evidently flows into the bay from the valley. At that point he also noted four wolves, and with them a musk-ox, the first of the season. Leading to the valley he also found what appeared to be a musk-ox trail (similar to the buffalo trails of the "Far West"), which indicated plainly that the valley was a winter resort for these animals.

While at that camp (No. 3) surprise was expressed by nearly all at the great length of the bay. Lieutenant Archer, looking into it from Stony Cape, had judged it to be ten miles long, and I thought it to be about fifteen miles. Looking over the distance we had already travelled, we concluded it to be fully forty miles from Stony Cape to the extreme southwest point, where we believed the end to be. It was evident that the nearest land to the westward was very high, as its apparent elevation had undergone slight change, although we were some sixteen miles nearer it than at Stony Cape. Doubtless the point where we were camped was thought by Lieutenant Archer to have been the end of the bay, an opinion in which I would have concurred on leaving Stony Cape.

The temperature fell to -4° (-20° C.) at this camp, and on calling the cook it stood at zero (-17.8° C.). When packing the

single Hudson Bay sledge, it was found necessary to abandon a pair of snow-shoes and a spade; in addition, we cached a day's ration for our return journey.

We started westward at 9.30 P.M. with a falling temperature, -8° (-22.2° C.), clear sky and light easterly wind.

The deep interest with which we had hitherto pursued our journey was now greatly intensified. The eye of civilized man



Chandler Fiord looking east from Camp 3, Miller Island in centre.

[From photograph.]

had not seen, nor his foot trodden, the ground over which we were travelling. A strong, earnest desire to press forward at our best gait seized us all. As we neared each projecting spur of the high headlands, our eagerness to see what was beyond became so intense at times as to be painful. Each point reached, and a new landscape in sight, we found our pleasure not unalloyed, for ever in advance was yet a point which cut

off a portion of the horizon and caused a certain disappointment.

Our travelling was for a time along the ice-foot at the base of very high and precipitous cliffs, evidently of schistose slate. They rose as sheer precipices, over two thousand feet above the level of the bay—solid rock, without a vestige of vegetation to cover their nakedness. Indeed, the only vegetation seen for some ten miles, travelling along these cliffs, was on an outlying spur of clayey earth at the point where our previous camp had been made. In one place a narrow cleft, apparently not more than a hundred feet wide and over a thousand feet deep, broke the continuity of the crest of the cliffs.

It would have been very dangerous to camp at the base of these crags, as the ice-foot was strewn with many fallen rocks. Even as we travelled along several masses fell hundreds upon hundreds of feet, until checked by the ice-foot at the edge of the shore. At one place a rock, which must have weighed several tons, was lying on a large palæocrystic floe about a half mile from the shore. I visited and examined it, thinking it might have been brought from some other cliffs, but it was apparently of the same formation as those near by. It is worthy of remark, that this was the farthest point at which palæocrystic floes were seen in this bay—good evidence that they drifted from the polar ocean. After following a fair ice-foot nearly three hours, we tried the snow-covered floe, and, finding that the crust would bear us, kept well out from the shore and turned our course to the southwest, which seemed to be the true end of the fiord.

At that time directly in front of us was an abrupt rocky promontory, the most prominent headland in the bay, whose elevation was nearly three thousand feet. Between this bold headland and the cliffs along which we were travelling a valley

seemed to break in to the northward. To the southwest there was a second prominent mountain, with other breaks to the northward of it, which showed that, if the main fiord did not extend in that direction, a bay must at least exist, which possibly trended to the northwest. Owing to this uncertain condition of affairs, and in order to save time, I left the drag-ropes and directed the party to travel for the nearest headland. On reaching that point one of the party was to make tea, while another should travel to the north for half an hour, if unable sooner to determine the prospects for an advance in that direction.

Leaving the party at 12.30 A.M., I travelled toward the southwest. After going some three hundred yards over fair travelling, I fell in with smooth and bluish ice, evidently of fresh water, which was covered with a hard, thin layer of snow affording the best of travel.

In order not to delay the sledge, I took up a slow dog-trot, hoping to reach the land to the southwest and determine the extent of the bay in that direction. Just at that time an opening to the north came in view, disclosing a narrow bay, or fiord, which extended a long distance. At its apparent head, some ten or twelve miles distant, a broad band of glittering ice showed up plainly, which I supposed to be the front of a large glacier. Beyond it were low hills on either side, while in the distant background snow-clad mountains of the hog-back character appeared. The bay discovered by Lieutenant Archer, gradually enlarging, had now developed into an extensive and important fiord. In attaching to it later the name of Chandler, I desired to show in a faint way my appreciation of the great energy shown, and serious responsibility assumed by Mr. Chandler, in fitting out the Relief Expedition of 1884.

Both sides of the northern arm of the fiord in the foreground were shut in by huge precipitous cliffs. It seemed quite evident

that our line of future travel would lay in that direction, but I hastened on with an increased desire of determining the extent of the southern arm of the fiord without delaying my companions. My spring exercise, which had almost entirely consisted in running at a slow gait, now proved of marked benefit to me, and in an hour's alternate run and walk I must have travelled, at a low estimate, five or six miles. When I stopped I found myself in the centre of a nearly circular bay, which I designated Ida Bay. From the south to the northwest the shore was yet some two miles distant, but to the northward there was a projecting point not more than a mile from me. The bay was shaped somewhat like an ellipse, with the major axis from the southwest to the northeast, and about five miles by three in size. The bold promontory, which at the bifurcation of the fiord consisted of huge, precipitous crags, sloped backward to the west into comparatively low ground, leaving gentle valleys of upland between it and the prominent mountains that were seen at the head of the bay. The promontory first mentioned was about twenty-five hundred feet high, but, owing to the grandeur of the surrounding scenery, was hardly as impressive on near approach as at a distance.

The ravines to the westward, though narrow, yet gave indications of easy gradient, and travelling, if difficult, seemed possible through them. The low land to the southward was a marked feature of the country, and indicated an easy route for overland travel. My field journal says: "In that direction the land was comparatively low, with several small ravines and valleys until the hills rose again (to the eastward) in high bluffs, which, facing the new bay, also cut off from my view any portion of Miller Island to the eastward." (It was evident from Lieutenant Lockwood's discoveries of the ensuing year, that the river running through Musk-ox Valley, must empty into Ida Bay through one

of the ravines seen by me.) From the point I reached, the coast line of the bay was seen to be continuous, and no chance of farther travel over ice appeared possible.

I took a few bearings and made a rough sketch, which delayed me a few minutes. During this time I was chilled through, as my clothing was saturated from perspiration caused by rapid travelling; the temperature was -8.5° (-22.5° C.). Starting back, rapid travel soon warmed me up. I met Private Connell, about a mile from the sledge, coming to meet me, as the men were somewhat alarmed at my long absence.

The party, on reaching the promontory, had made good use of their time. As soon as the sledge stopped Whisler had travelled up the fiord to the next point, finding excellent ice for travel and the best of prospects ahead. Connell had cooked a comfortable lunch for the party. Bender had improved the delay by repairing most ingeniously the sledge, which had been split by the rough ice. He succeeded in rendering it thoroughly serviceable, as well as in reducing its friction. The helpfulness of my men was particularly marked in this instance, as this work had been done by them without any special instructions to that effect. On my arrival at the sledge it was found repaired, repacked, and ready for instant travel, while a cup of warm tea was waiting for me. I delayed the sledge for a few minutes to take the warm drink, and then started to the northward.

We kept directly up the arm of the fiord, as the ice-foot was poor and ill-marked, and the outer ice afforded perfect travel. It was evident from the character of the ice that we were approaching the mouth of a river, or discharging glacier; for, in place of opaque, whitish ice, we found the surface of the fiord covered with layers of fresh-water ice of great clearness and marked beauty. Its delicate blue contrasted sharply with the

underlying strata of the sea-ice. In places the overlying fresh-water ice was at least six feet thick, composed of several clearly defined strata. There was no doubt the river, or glacier, discharging its water at low tide over the surface and damming below, had formed these strata at different periods.

As we travelled up the fiord, the cliffs which bounded it gradually decreased in height, and a low hilly country beyond opened up, while the snow-capped peaks of the United States mountains became more prominently and clearly outlined.

The day was beautiful—with a sky of perfect blue, no wind, and a very steady temperature, from -2° (-18.9° C.) to -8° (-22.2° C.). As we approached the ice a very light wind from the northeast was experienced, which appeared to us as the cold air descending from a glacier.

The glacier front, as we thought it to be, was scarcely a mile distant, and we were anxious to proceed, but I deemed it prudent to refrain from overwork.

We went into camp at 7 A.M. (No. 4) after eight hours' work, during which we had travelled twenty-one miles, exclusive of the side trips.

My field journal says: "To-day's discoveries change Conybeare Bay into a fiord (Chandler Fiord). It is quite certain that the site of camp No. 3 where the two valleys united, is that which was thought to be the end of the bay by Lieutenant Archer's party. This is evident, not only from the appearance of the country from Stony Cape, which conveyed the same impression to me, but also from the bearings given on his map. Archer Fiord to the southward of Miller Island was completely shut off by the south side of Conybeare Bay just after leaving camp No. 3, so that the greater part of to-day's travel has been over a part of the fiord which could not possibly have been seen by Lieutenant Archer. The arm of the fiord

opens to the north, a direction to an observing eye from the eastward, the most unlikely. This arm, about five miles wide at its southern extremity, narrows gradually to three miles at our present camp. On the eastern side the cliffs are continuous—sheer precipices—save occasional breaks, or notches, which are in no manner practicable. The general elevation is never less than one thousand, and sometimes as great as fifteen hundred, feet. On the west side, the cliffs, while attaining a general elevation of about two thousand feet (decreasing gradually from three thousand feet at Promontory Point to fifteen hundred at our present camp), have occasional gorges of no great size, which never attain to the dignity of ravines. Possibly at one gorge they could be scaled, but it would be decidedly hazardous. Our journey of twenty-one miles is a remarkable day's travel, which never could have been made except by reason of the extraordinary conditions of the ice. I have worked all day in the drag-ropes, except during the time taken for some eight miles extra travel, and am quite worn out this morning from lack of sleep through pain in my left foot, caused by breaking through the snow, covering a tidal crack, into the sharp-pointed ice beneath, while pulling heavily. The instep appears to be badly bruised, and I suffer much from it to-day, although at the time it did not appear to be so serious. I regretted to break in on Connell's sleep after a long march, but I felt the necessity of getting both latitude and time sights at this point."

CHAPTER XVII.

LAKE HAZEN.

IT was evident that we were at the head of Chandler Fiord, and farther progress must be over the glacier or through some adjacent valley. The evening was a perfect one for Arctic travel—calm, clear, with a temperature of -4° (-20° C.). Leaving a day's rations safely cached on shore near camp No. 4, an hour's steady travel over the best of ice brought us to what we had thought a glacier front. It proved to be an ice-dam, which rose fifteen feet above the level of the ice at its base, but, as the constant formation of ice at that point had raised the base, its top must have been twenty-five feet above the sea. From the vertical front occasional small streams of fresh water were trickling, which afforded us, for the first time during the trip, sufficient liquid to entirely quench our thirst.

A brief examination of the ice showed that we were at the junction of tide-water and a fresh-water river flowing from the interior. The stream runs through a valley about a mile wide, hemmed in by high cliffs, and discharges in summer over gentle rapids, or at the level of the sea, but the first heavy frost, forming heavy ice over the fiord, creates a dam which is gradually overflowed by the open river behind. By the end of winter results an ice-dam, a mile in width, and twenty-five feet in height.

The river-ice was found level and smooth, affording such excellent travelling that the traction of the sledge was not felt. In consequence I dropped the drag-belt for the day.

During the first hour's travelling occasional shallow pools of fresh water were found on the surface of the ice, which were an especial pleasure to Whisler, who frequently dropped the drag-belt to enjoy the clear cold water. The ice was a delicate whitish-blue, very clear, and in places so transparent for three or four feet that several overlying strata, twisted and distorted, could be seen.

The river proved to be very crooked, and though in most places we were able to travel directly from point to point, some slight detours were rendered necessary in order to avoid wetting our foot-gear in the occasional water-pools.

Two hours' travelling brought us to a small rocky island in the centre of the river, which had been prominent for the previous ten miles, and which first seemed to be a projecting point. It proved to be five hundred feet by three hundred in size, of about thirty feet in elevation, with a level, smooth top. It had evidently been subjected to glacial action in previous ages, but showed no signs of such in recent years. Considerable vegetation, such as saxifrage, *dryas*, a number of grasses, and occasional willows, was found.

The travelling improved as we advanced up the river, and my field journal says: "The sledge runs very easily, offering no impediment to the men's travelling freely, and, although myself moving at my best gait, I was unable to get two hundred yards' start of them in an hour's travelling. In many places we slid along without taking our feet from the ice for a hundred yards at a time. The river fills the entire valley and is of a varying width from one and a half to four miles. Hills are becoming considerably lower on both sides, while the mountains in the background are rapidly rising into great prominence. Though winding very much, the general direction of the river is nearly northwest. We camped at about 3 A.M.,

after some eighteen miles' travel over the best road I have ever seen within the Arctic Circle. I have made to-day's trip a short one, partly on account of the great pain from my foot, and partly because yesterday's long journey, with the side marches and the little rest owing to observations, was very trying to the party. It seems to me that a long rest will gain time in the end. Many tracks of musk-oxen have been seen to-day along the river's edge, and a few on the ice, all comparatively fresh."

While Bender was cooking, Connell and Whisler, with their usual energy, were out looking over the adjoining country. Whisler brought in some common moss, which was quite green. Connell reported that from an adjacent hill he had a fine view to the northward, in which direction the mountains showed up very prominently. He also saw many musk-ox trails, running from the direction of the mountains to the southward.

April 30th we started at 3 P.M. The temperature was comparatively high, being $+4^{\circ}$ (-15.6° C.) under the influence of the sun, though it had been down to -8° (-22.2° C.). A light northerly wind was accompanied by a few delicate cirri, the first clouds of any character seen since leaving Conger.

The excellent condition of the ice, and the rapidity of our travel, was instanced by the experience of Whisler, who, delaying at camp about five minutes, was unable in an hour's time to catch us, although travelling at his best gait. We were fortunate enough to find several pools of water on the surface of the ice, which were refreshing in the extreme.

At times the course of the river was very tortuous, and in an hour we travelled first north, then northwest, afterward to the west, and eventually to the north again, though my journal says: "We have the great advantage of being able to travel most of the time from point to point in a straight line, which

greatly facilitates our progress, for if we were obliged to follow the shores of the river the distance would be more than doubled."

We passed one place where the river flowed between a narrow gorge of only eighty yards in width with high, precipitous cliffs. While resting in this gorge we could plainly hear the noise of the water flowing under the ice. Occasionally we struck snow with hard crust, which, though affording excellent travel, was so inferior to the ice that it cut our gait down sometimes as low as two and a half miles an hour. The elevation of the river above the sea increased more rapidly during this day than the preceding one. Fresh tracks of the musk-ox, fox, hare, and lemming were seen along the shore.

At 7 P.M. we were astonished beyond measure at reaching a point where the stream was open. I was almost inclined to doubt the evidence of my own eyes, and, indeed, rubbed them once before answering the inquiry of one of the men as to what that was. The open river, about fifty yards wide and of clear water, was a rapidly running stream of an average depth of two feet. This stream was bounded on both sides by thick, clear ice of ten feet in thickness.

We travelled alongside the open river, keeping to the bordering ice-walls, which decreased in thickness and eventually disappeared entirely at a point where the stream doubtless remains open the entire year. Here we were driven to the hill-side, where the deep snow and sharp projecting rocks made travel slow, and rendered the task of keeping the sledge upright a severe one. A couple of hundred yards farther and a sharp turn brought in sight a scene which we shall all remember to our dying day. Before us was an immense ice-bound lake. Its snowy covering reflected "diamond dust," from the midnight sun, and at our feet was a broad pool of open blue water which fed

the river. To the northward some eight or ten miles—its base at the northern edge of the lake (Hazen)—a partly snow-clad range of high hills (Garfield range) appeared, behind and above which the hog-back, snow-clad summits of the United States mountains rose with their stern, unchanging splendor. To right and left on the southern shore low, rounded hills, bare, as a rule, of snow, extended far to east and west, until in reality or perspective they joined the curving mountains to the north. The scene was one of great beauty and impressiveness.

The excitement and enthusiasm which our new discoveries had engendered here culminated, for our vantage ground was such that all seemed revealed and no point hidden. Connell, who had continually lamented the frozen foot which turned him back from the trip to North Greenland, declared enthusiastically that he would not have missed the scene and discoveries for all the Polar Sea.

Although the march had not exceeded ten miles, I concluded to camp where water was to be had, and in order to determine in which direction our steps could be turned to best advantage. We accordingly bivouacked at the junction of Ruggles River (temporarily so called) and Lake Hazen.

As we were about entering camp, a dark-colored bird, about the size of a plover, flew swiftly by us from behind and disappeared. It was neither snow-bunting or ptarmigan, as all agreed. Wolf, fox, lemming, hare, musk-ox, and ptarmigan tracks were all seen during the day.

At this camp, No. 5, I obtained a fair set of time observations, and quite wore out myself and the rest of the party by sitting up for latitude observations. I succeeded in obtaining a set of subpolar observations, which were not perfect, owing to the prevalence of light cirrus clouds and the altitude of the sun, which was at midnight only 7° above the horizon. In the time

between the two observations Private Connell travelled about five miles to the eastward along the lake, and from his extreme point, a hill of moderate elevation, he could see the end of the lake. The mountains in that direction, he said, decreased in elevation, finally terminating in hog-back hills to the southward.

Private Bender was sent to the northward to cross the lake and examine the valley opposite, which seemed to be of considerable size and appeared to have a glacier in its northern termination. He returned after four hours' travel, and reported the opposite valley to be unimportant. Near the northern shore he had discovered the existence of a long, narrow island (John's island) of considerable elevation, which, from our camp, appeared to be part of the main-land.

The night was a clear, beautiful one, with only a breath of wind and the temperature -3° (-19.4° C.), so that, while Connell and myself occupied the sheep-skin bag within the dog-tent, Whisler and Bender slept on the outer ground.

Numerous tracks of ptarmigan and hares were seen in the vicinity of our camp, and while I was making the midnight observations a ptarmigan came within twenty-five feet of us, but flew away before our work was completed. At 5 A.M. I was awakened by the calling of a ptarmigan, which seemed to be challenging another bird that answered within a few feet of me. I called to Whisler, who had the revolver, to shoot the bird. He reported that it was perched on the ridge-pole about two feet above my head. As he was a good marksman, I told him to take very careful aim and shoot it; but Connell, who was in the bag with me, displayed such a marked lack of confidence in Whisler's marksmanship, that in deference to his doubts I directed Whisler not to fire, and so the bird escaped.

My journal of May 1st says: "Early this morning I started

east, and, ascending a hill four miles distant from the camp, observed to the eastward of the lake hog-back hills, which were of considerably lower elevation than the mountains to the north. Two ptarmigan alighted on the hill, one of which came within five or six yards of me, giving utterance to frequent calls, which were interrupted every few seconds by other notes sounding like a challenge. I stood perfectly quiet and admired his plumage of pure white, spotted only by the crimson-red of his eyelids; when tired of examining me he leisurely flew away.

"There appear to be a number of glaciers on the north side of the lake, but the bad light, with the sun beyond them, rendered it impossible to speak with certainty.

"Willow, as well as grass, was quite plentiful. Old willow shrubs in small quantities were seen, and I doubt not, in case of necessity, enough for cooking purposes could be found.

"There was very little snow to be seen over the hills on the south side of the lake, but the mountains which separated the lake on the north side from the snowy range were partly snow-clad, similar to those in the vicinity of Conger. The lake was packed with hard, level snow of about a foot in depth, which was covered with a strong crust. The *sastrugi* showed prevailing northeast winds.

"There is in the snow-covered mountains to the northward a twin peak; two cones running together, that to the eastward being of slightly lower elevation than the one to the westward; both are pure white, distant from thirty-five to forty miles, and about five thousand feet high.

"My attempt to obtain time observations this morning were but partly successful, owing to obscuring clouds. It seems strange that the heavens over the lake to the westward, and, indeed, in every direction except toward Robeson Channel, are cloudless and bright."

We got into our sleeping-bags at 4.30 A.M., and turned out at eleven o'clock for latitude observations, which were again poor and unsatisfactory, owing to the covered sky.

While breakfast was being prepared, Whisler reported that he had seen fish six or seven inches long in the lake; Connell, with pin-hook and line, tried fishing unsuccessfully.

Whisler, who had visited the hills to the westward of Ruggles River, reported a number of musk-oxen in sight, with evidences of a larger number in that direction. While absent he shot a ptarmigan.

At 2 P.M., May 2d, we started to the westward along the south shore of Lake Hazen. We were obliged to make a detour into the lake to pass around the open water which feeds the river, and which extends unfrozen for about one hundred and fifty yards into the lake.

What appeared to be a glacier on the north side opened up to view, but after a careful examination with the telescope we decided it to be only snow.

The men travelled along the lake shore, while I left them at various times to examine the character of the country to the southward, over which I travelled about a mile distant from and parallel to the lake. It was found invariably to consist "of small hills, from none of which was the view extensive." The ascent to the southward was very gradual, and no high land in that quarter was visible. Much grass, many willows, and other vegetation abounded, while, to my surprise, not more than a quarter of the ground was then covered by snow. Several hours of this travelling, from its rough character, proved very injurious to my lame foot, which was protected against the stones only by moccasins, and I returned to the lake. During a portion of the day the men travelled in snow-shoes, which were of service, although they were not much accustomed to their use.

Along the shore we fell in with two hares, one of which Whisler shot with a revolver, while the second, though wounded, escaped. In pursuing it Whisler saw a third hare, and struck a trail over which a number of musk-oxen had lately travelled.

Five hours' march brought us to a "remarkable ridge of pebbles and smooth stones, which extend for a hundred yards or more along the shore, with their bases at the high-water mark. In some cases the ridges were twelve feet above the level of the surrounding ground. While it is possible that ice or snow might form a part of them, it is hardly probable, as none was seen anywhere in connection with them, they being merely high parallel ridges of pebbles. The direction of *sastrugi* on the lake shows prevailing northeasterly winds, and these ridges were situated so that the winds would have full force over them. After a careful examination I have come to the conclusion that they have been formed during severe gales from the northeast quarter, which must force the ice violently against this shore during the summer or early autumn." This opinion was confirmed by direct evidence the following summer.

After nearly seven hours' travel we camped, having made probably sixteen or seventeen miles, although the men insisted that it was over twenty.

My field journal that morning says: "During to-day's travelling I found along the entire shore of the lake four distinct ridges of pebbles, thus affording suitable evidence that the water has attained four different levels in separate years. The highest ridge was the outside one, nearest the lake, and is about six or seven feet above the level of the ice, which is fully fifty yards distant. There is no ice-foot along the lake, as none is to be expected, but the ice is grounded and fixed fast to the shore at the very edge, and as the water falls it slopes gradually toward the centre of the lake, occasionally separated

from the main body of ice by deep, narrow cracks. The sloping of the ice rendered it necessary in following the contours of the shore to keep about a hundred yards out from its edge, where the snow-crust was stronger and better than elsewhere. Any attempt to proceed toward the centre of the lake invariably resulted in the party breaking through the crust, which made our progress slow and difficult.

"Opposite our present camp, on the northwest side of the lake, we have seen during the afternoon travel what is evidently a large glacier. It was hidden from view farther to the east by a projection of the land on its eastern side, where several small mountains are situated."

We had a good rest at camp No. 7, where we spent twelve hours, being delayed somewhat by the bad behavior of the cooking-lamp. The temperature sank to zero (-17.8° C.) during the night, which, in connection with a light wind, made it uncomfortably cool, but in the early morning the wind died away, rendering travel delightful.

While the men were packing the sledge on May 2d, I walked rapidly along the shore to the next point, in order to examine the country, and determine whether it would be best to proceed westward to the end of the lake, or northward to the glacier which had been in sight since the previous day.

On reaching the point I was not entirely satisfied that I could see the end of the lake, although the men on arrival maintained that it was in view. My field journal says: "I feel confident from the break in the land to the southwest, between the mountain range in the north and the low hills to the south, that there must be a valley or pass leading westward."

As the distance clearly seen to the westward was at least twelve miles, and it was doubtful if we could reach it by the day's travel, I decided to cross the lake to the glacier and deter-

mine something of its size and character. I also hoped that from the adjoining mountains something more satisfactory could be seen of the topography of the country to the southwest. We consequently turned north to cross Lake Hazen. In a short distance the travel was found of the worst possible character, the crust being just too weak to support the weight of a man. In consequence the men put on snow-shoes, of which there were three pairs, while I followed the sledge. After six hours' travelling, during which we had marched twelve miles from our previous camp, we stopped inshore from the lake a scant mile and made camp No. 8. We were then three miles east of Henrietta Nesmith glacier, which I named for my wife.

The snow-covered ground rose so gradually, from the level of the lake, that we were not conscious of having reached it until we were some distance inland. I unwisely decided to camp there, expecting to obtain our ice from the lake near-by. As soon as camp was reached, Connell and Bender arranged the tent and commenced preparations for supper. We were all quite exhausted by the difficult travelling, but I decided to visit the glacier front at once, fearing that I should be prevented by some unforeseen contingency the following morning. Private Whisler asked also to visit it and obtain ice for cooking purposes for supper, as the ice near-by was very dirty and unfit for use. I advised him not to do so, owing to the great distance. He started directly for the main front by the way of a small bay, through which the water from the glacier reaches Lake Hazen. I decided to follow up along the base of four small mountains to the eastward of the glacier, as they seemed to abut against it and afford a route by which I could reach its surface.

While *en route* I found a large pasture-ground, where musk-oxen had broken the crust and scraped away the snow to reach the willows, grass, and saxifrages which grew plentifully at that

place. Traces of musk-oxen, from a day to weeks old, were met with. In different places there were direct signs that some of the crust had been broken since the last storm, other portions prior to the last storm, and still others long before that time. The evidences were marked and clear that this point was a pasture-ground much frequented by these animals.

Hare and wolf tracks were quite frequent in the vicinity, but there were none of the fox, although traces were seen that morning in crossing the lake. It was a matter of surprise to me, despite these marked evidences of considerable numbers of musk-oxen on the north side of the lake, and similar traces of equal numbers on the south side, that at no place was the track of a musk-ox to be found at the edge of the lake or on the main floe. This would seem to show a disinclination to cross any extent of ice, as was the case along the Ruggles River, where the foot-tracks on the river-ice were near the very edge.

I had hoped to find the top or crown of the glacier flush with and pressing against some point of the mountains, so as to permit an examination of it, but such was not the case. From the central medial line the crown sloped down gradually to either side, and near the mountains the angle of descent was sharper, but at a distance of a hundred yards from the mountain it stopped, leaving a perpendicular wall of ice twenty-five to thirty feet high. With considerable difficulty I climbed the steep mountain-side, which was covered with coarse, yielding sand, until I was far above the edge, and apparently on the same level as the opposite central crown of the glacier, which was about four hundred yards from the centre of the main or discharging front. My barometer then read 28.89. Descending the precipitous cliffs, I then stood at the eastern base four hundred yards lower down the glacier than the point opposite my station on the hill. The barometer then read 29.49. The

difference of the two elevations was not far from five hundred and twenty feet. I estimated the height of the vertical front of the glacier at that place to be one hundred and fifty to one hundred and seventy-five feet. This gave the glacier a very large slope of three hundred and sixty to three hundred and eighty feet in a distance of four hundred yards, which seemed to indicate an enormous thickness of the ice in rear.



Henrietta Nesmith Glacier.

[Showing eastern edge crowding against the mountains.]

During the day's march the glacier had gradually grown from a narrow line of ice to a sharply defined bank, which from camp, two or three miles distant, appeared to be perhaps twenty-five feet high. A nearer approach, causing it to tower into enormous proportions, awakened my wonder and admiration, which continually increased as I examined it critically from its front, and came to have a just idea of its magnitude. The face, convex,

or crescent-shaped, was about five miles from hill to hill—a mass of sheer, solid ice, averaging about one hundred and seventy-five feet in height, though in one place as low as one hundred and again as high as two hundred feet.

My field journal says: "The top of it was a pure dead-white, densely opaque, resembling in a marked manner the surface of loaf-sugar, or broken and unpolished white marble. Lower down it shaded into a color bordering on blue, the whole very much resembling floebergs. In general, the color of the ice, which lay in detached piles at the foot, was a delicate blue, shading closely on the white, but in certain places strata of a faint yellowish color were to be seen. These strata were invariably confined to certain points, and formed a very inconsiderable portion of the visible front. Their color while in the glacier itself gave the appearance of a delicately tinted rose-shade, which, as I have said, changed to a faint yellowish on close examination. There were three large deeply-worn gullies or channels on the surface of the glacier, one at the centre and one near each side, which showed that in the summer and autumn very considerable streams of water must be discharged from the surface of the glacier. The side gullies were of inconsiderable size compared with the central one. The lowest part of the crown of the glacier was at a point where water of the largest discharging channel had worn deeply into the ice, leaving its elevation not more than a hundred feet.

I saw several moraines on the southwestern side, but was too much worn out by travel in the deep snow in front of the glacier to visit them. The next morning Connell visited and examined them. The following description was obtained immediately on his return:

The moraines were three in number, situated near the western face of the glacier, and nearly parallel to each other. They

were composed of black sand mixed with coarse pebbles and occasional boulders of small size. No large blocks of stone were visible. No. 1, about twenty yards in length and fifteen feet high, extended in a gentle curve from a point within about five yards of the glacier front to a point twenty yards distant from the base of the high hill to the westward, against which the side of the glacier pressed. The nearest point of the moraine was so close to the glacier front that the falling ice covered a portion of it.

No. 2 was likewise fifteen feet high, about seventy yards long, and generally parallel to and about ten yards distant from No. 1. No. 3 was about twenty feet high, a hundred yards long, parallel to, and thirty yards distant from No. 2. The front of each moraine was nearly perpendicular, but the rear portion (that part nearest the glacier) gently sloping.

The appearance of the moraines seemed to indicate that within a moderately late period the western spur of the glacier must have advanced and retrograded three separate times, the period of retrogradation in each case being more marked than that of progression, as shown by the greater size and importance of the moraines, as the distance from the present front increased.

Careful observations resulted in no satisfactory evidence as to whether the glacier is at present progressing or retrograding. I think it hardly possible that in late years it could have extended any considerable distance farther than its present front. This opinion seemed reasonable, not only from the presence of the moraines, but because the hills immediately adjacent to and in front of the glacier, and but slightly above the level of the lake, showed plants and lichens which were common to the entire country, such as purple saxifrage, Arctic willow, *dryas*, and the poppy. Over the lower grounds immense quantities of sand were scattered, probably deposited from the

summer streams, which were so intermixed with the snow that it was impossible to tell where the land ended and the lake commenced.

No yellow strata of ice, such as had been seen near the centre, were visible in the western half of the glacier. We had heard masses of ice falling frequently during the night, and a considerable quantity broke and fell from the front while Connell was opposite that discharging stream, which is a little east of the centre front at the lowest point of the crown.

The ice when undetached had presented at its great height a light yellow shade, but newly fallen it was found on examination by Connell to be of a fine pink tinge, quite marked in the masses. A small watercourse runs at certain seasons of the year from the western side along the front between the glacier and the moraines. Although covered with level ice, no running water could be heard by Connell, nor could any be obtained by digging with a hunting-knife. It is possible that this watercourse may come from some discharging brook of main importance, which, being on the western slope of the glacier, could not be seen from an exterior standpoint.

Three similar watercourses were discovered by me some distance in front of the main brook, which discharged from the centre of the crown of the glacier. It occurred to me as being possible that the western brook might discharge from under the glacier, as frequently occurs in the Greenland fiords.

This summer surface-discharge seemed singular to me, and I examined all the watercourses which appeared to be entirely dry and with but little ice, but the deep snow might have easily concealed some stream of water under the surface-ice.

Private Bender left at the same time as Connell, with orders to ascend, if possible, one of the adjacent mountains, in order to examine the country to the westward. He was unable to ascend

to the summit of either, as the base and side of the mountains were covered with soft, yielding sand, laying at such an angle as rendered an ascent to the top hopeless. It seemed probable from his account that this sand was a deposit resulting from the grinding of the mountain-side by the glacier at some former time. From the highest point reached by him he was unable to see any considerable distance up the glacier, owing to intervening mountains. To the southwest he could see some twenty-five miles or more. The lake appeared to end in a small, nearly land-locked bay some fifteen miles distant, beyond which nothing could be seen except a succession of low, rounded hills. The same description of country existed to the southward, although the hills were slightly higher. No high mountains were visible in either quarter. There appeared a decided break in the country to the westward of Lake Hazen, as the ice-clad mountains to the north of us very abruptly gave place to low hills. A few mountains to the westward were partly snow-clad, the most prominent of which was a pyramid-shaped mountain some twenty miles distant, that had been our landmark ever since the lake had been reached, and which now bears the name of Whisler. Unfortunately I neglected to send a barometer with Bender, so the exact elevation of the point reached by him is uncertain, but he thought it to be not far from two thousand feet.

On returning from Henrietta Nesmith glacier to camp on the north side of Lake Hazen, May 3d, I noticed an atmospheric phenomenon which seemed to me unique; it was a beautiful mock-sun, accompanied by clearly defined prismatic colors, at a distance of 120° from the sun. This phenomenon was seen in the only quarter of the heavens which at that time was covered with light clouds, being nearly south of the glacier, which was at my back.

I since find this phenomenon mentioned by Flammarion as being especially remarkable and rare. He says: "Sometimes the solar rays experience two successive reflections upon the vertical surfaces of one of the prisms. There is then visible, at 120° from the sun, a white image more or less diffuse, which has received the name of *paranthelion*. The horizontal bars of the ice-crystals reflect also the solar light, but in an upward direction, which prevents the spectator from perceiving it unless he be upon the summit of a steep mountain, or in the car of a balloon, above the cloud containing the icy particles. It will be readily admitted that these conditions can rarely be fulfilled; but MM. Barrae and Bixio were fortunately able to realize them on July 27, 1850. The image of the sun thus reflected appears almost as luminous as the sun itself. Bravais suggested for this phenomenon, at once so remarkable and so rare, the name of *pseudohelion*."

May 4th, we built a cairn on a prominent hill about two miles east of the glacier, and three hundred feet above the lake, in which was deposited a notice of our visit. The cairn is about five feet high and is quite prominent from the eastward, but in other directions does not show up until near at hand.

I succeeded in obtaining a good set of time observations, but did not deem it advisable to wait for latitude. The high temperature of the air at that time (-11° F., -11.7° C.), and the fact of the country to the westward being open, decided me to return at once to Conger and attempt a second trip later in the year. It was evident that if we turned our faces to the westward we could travel no farther than we had already seen, and the high temperature caused me to fear that the river would break up behind us, in which case our return to Conger would be a matter of extreme difficulty, if not considerable danger.

We consequently took a direct course across the lake for the

mouth of Ruggles River, and after eight hours' steady travelling arrived there in an exhausted condition.

The desire to reach a point where water could be obtained and fuel saved was the only incentive which enabled us to make this journey in a single march. The lake could have been crossed in a single day with no other sledge than a Hudson Bay, as, while the surface of the crust frequently broke under one of the party, the sledge never stopped during our entire march. I estimated the distance at twenty miles, though the men insisted it must have been at least twenty-five. We were obliged to make occasional detours from a straight line of travel, owing to the character of the ice and snow fallen in with.

While crossing the lake a number of cracks were found, and it frequently occurred that the ice sank an inch or two whenever the party passing a crack reached other ice. It seemed evident from this that the glacier streams which discharged into the lake must be frozen quite or entirely up during the winter. The supply of the lake being thus cut off, there is a difference between the winter and summer levels not far from six or seven feet, and the ice gradually sinks as the water fails.

The tracks of wolves at the camp indicated a visit during our absence, but the ptarmigan which we had cached under snow-blocks was still undisturbed.

Time observations were taken, and the next morning, after caching fourteen cans of beef, we started at seven o'clock and travelled with the utmost rapidity until noon, when I stopped for latitude, and decided to make camp No. 9 at that point. The distance travelled in this march was estimated at seventeen miles. Our journey lay along the open river for a time, and I took a number of observations to determine its discharge. The river at that point was seventy-five yards wide and two feet deep, with a rocky bottom. From the mean of these observations,

the current of the river was determined to be over three hundred and fifty feet a minute, or about four miles an hour.

During the day, as we were marching, four musk-oxen were seen on the hill to the east, and later, after making camp, six others observed to the southeast. It seemed possible to us that they attained the summit of these hills from the valley visited by Connell at camp No. 3. It is evident that they could not reach the river directly, as the cliffs were far too precipitous.

A long rest of twelve hours put our feet in good condition for our next march, which began at midnight of May 4th to 5th.

A few scattered snow-flakes and a very high temperature of $+31^{\circ}$ (-0.6° C.) seemed to threaten bad weather, the first of the journey. During the day we passed a very small island near the eastern shore, which had not been noticed by us on our outward trip. Another small island was discovered near the western shore some distance lower down the river. It was some fifty yards across by a hundred yards long, with an elevation of ten to fifteen feet above the river. It consisted almost entirely of gravel, with but scanty vegetation. The number of water-pools on the ice had increased since our upward journey, and detours were occasionally necessary to pass them. They finally drove us to the eastern shore near the large island discovered in our outward journey.

We passed the ice-dam on the eastern end, where there were large ridges of heavy ice in front of and parallel to the main dam. A careful examination of this ice-dam left me of the opinion that there were no natural falls at this point, but that it was simply a dam of ice formed from natural causes during the winter. Bender was here detached with a knapsack to take up the cache left at camp No. 4, while we proceeded, and after seven hours' travelling made camp No. 10 on the ice in Chandler Fiord.

After an hour, as breakfast was ready, and Private Bender not in sight, Whisler was sent to meet him. A slight fog had risen in the meantime, which was quite thick and rendered it possible to see only a short distance. Connell, going a few hundred yards from camp, kept Whisler in sight, while I in turn kept Connell in sight. Finally Bender arrived, nearly two hours behind us. He had lost himself in the fog, and, strange to say, had turned his face up the stream and recrossed the dam before he found out where he was. Finding himself on the wrong shore, he waited for the fog to clear before trying it again. He informed me that on the western side the river had commenced breaking up, and in one place a water-hole over a hundred feet in length had formed. The ice-dam to the extreme west was nearly level with the land, which explains why so much smooth fresh-water ice was found on that side and but little or none on the east.

The weather was so warm that I slept with open tent and flap.

We left camp No. 11 that morning about 8.30. Camped at 7.08 P.M., May 6th, between camps 1 and 2. Whisler's eyes pained him very much from snow-blindness, and he could scarcely see. I dropped wine of opium in them.

On May 7th we started about 4.30 A.M., and in five hours reached the tent at Basil Norris Bay, where we rested a few minutes to melt ice for water. Leaving here all our supply of food, except enough for a single meal, we reached French Cape a little before noon, quite worn out with our seven hours' travel.

Two hours were spent in preparing a meal, after which the threatening weather was such that I decided to attempt to reach the home station, although we were very much exhausted. We left at 1.45 P.M., at which time a strong easterly wind prevailed, followed a short time later by occasional light snow.

After a little over two hours' travelling, Connell complained of

severe cramps in his legs and knees, and a few minutes after was obliged to give out and quit the drag-belt. I endeavored to prevail upon him to get on the sledge, which he begged permission not to do, saying he was able to hobble into camp by himself. Stopping occasionally to keep Connell in view, as I was unwilling to permit him to get out of our sight during the wind and snow in his exhausted condition, we were finally met a half mile from the station by Schneider and Henry, one of whom took my place in the drag-belt, while the other went out to meet and assist Connell. A few minutes later Doctor Pavy and Jens came with the dog-sledge, which was sent to bring Connell in. We reached Conger at 7.20 P.M., having travelled thirteen hours and a distance of nearly thirty miles.

This sledge journey was an exceedingly fruitful one in its results. It disclosed physical conditions in the interior of Grinnell Land hitherto unsuspected. The absence of discharging glaciers, which had excited remark on account of the extreme latitude of Grinnell Land, was now explained by the discovery of a broken, rugged country, intersected by a system of fiords and lakes, which readily drains, during the short Arctic summer, the inconsiderable snow-fall. The valleys, bare of snow, give birth to vegetation, luxuriant for the latitude, which serves as pasturage for considerable game.

This journey involved over two hundred and fifty miles' travel, which was made in twelve days. The rate of travel compares favorably even with McClintock's most extraordinary journeys. The system of reasonable journeys, and immediate travel after necessary rest, ample and nourishing food, exceedingly light equipment, and smooth ice, all favored and facilitated rapid progress. To these conditions were united others essential to successful sledging—the hearty co-operation, great persistency, and untiring energy of the enlisted men of the party.

CHAPTER XVIII.

THE FARTHEST NORTH.—CONGER TO CAPE BRYANT.

[LIEUTENANT LOCKWOOD.]

WHILE the journeys described in the immediately preceding chapters were being made, the exploration of the North Greenland coast was being conducted under the efficient and active leadership of Lieutenant James B. Lockwood. The advance sledge was to be hauled by dogs, with Eskimo Christiansen as driver, and one enlisted man (preferably Sergeant Brainard) was to be selected, at Lieutenant Lockwood's discretion, from the most energetic of the supporting party at its farthest. Until the selection was made, Sergeant Jewell was to be with the dog-sledge. The supporting sledges—four of the Hudson Bay pattern—were to be hauled by Sergeants Brainard, Lynn, Ralston, Elison, Corporal Salor, Privates Biederbick, Connell, Frederick, Henry, and Whisler.

The weight of these men averaged 176 pounds; ranging from Whisler, 156, to Henry, 203. The average amount of extra clothing was ten pounds per man, consisting of sleeping-gear, extra socks, mittens, and jumpers. The clothing in wear was generally double suits of underclothing—one woollen and one blanket—three pairs socks, with outer ordinary wool clothing, over which a light duck suit was worn to keep the snow from adhering to the wool. A few only wore outer clothing of skin. The foot-gear was made up of moccasins, and Greenland, Lab-



LIEUTENANT JAMES B. LOCKWOOD.

(The leader to the Farthest North.)

rador, and canvas boots; enough being taken to furnish each man with two pairs.

Sergeant Brainard, in charge of the sledges Hayes, Kane, Hall, and Beaumont, left the station April 3d, in a temperature of -29° (-34° C.). They dragged on leaving seventy-eight pounds per man, which was to be increased slightly at Depots "A" and "B," and on leaving their base of supplies, in Newman Bay, was to be as near two hundred pounds as the state of the ice would permit them to haul. This accorded with my views, that the extreme hard work of sledging should be gradually reached in order to avoid overwork, which is most probable in the early days of strength and enthusiasm.

A few remarks bearing on the dangers of sledging, and the importance of caution and discretion, were made to the men on leaving. A general salute was given the party near the station, and I accompanied them with the puppy-team as far as Dutch Island.

Lieutenant Lockwood had remained at the station to perfect some personal arrangements, and left the following day. His team nominally was of eight dogs, averaging sixty-two pounds weight; but one dog, weighing forty pounds, never hauled the food she ate.

Lieutenant Lockwood's orders read: "You are charged with the full control and arrangement of the most important sledging and geographical work of this expedition—of exploring the northeast coast of Greenland. I am not unaware of the difficult position in which you are necessarily placed from our inability to lay out suitable depots to the northeast during the past autumn, from the limited number of your supporting parties, and from your working with a wide strait covered with ice separating you from your base of supplies and field of operations. The energy and discretion already displayed, united

to your endurance and experience (tested by nearly two hundred miles of field work this season, with temperatures lower than 90° below the freezing-point), give me strong assurance of success. . . . Memoranda showing the location of supplies to the northward will be furnished you. The object of this work will be to explore the coast of Greenland near Cape Britannia. Should you be fortunate enough to pass beyond that point, you will proceed in such direction as you think will best carry out the objects of the expedition—the extension of knowledge regarding lands within the Arctic Circle. . . . At your farthest, one day must be spent in determining your position . . . and in making such other observations as will be practicable. It is particularly desired that the period and character of the tides be noted, if any way possible. From the farthest land, specimens of the various rocks, vegetation, etc., should be obtained. . . . While it is desirable that Lieutenant Beaumont's cairns be visited, you are to make no considerable detours for such purposes. . . . The depots should be carefully noted and secured; each member of the party should be shown their exact location. . . . Your attention is invited to the danger of pursuing your journey beyond such point as your provisions are half consumed, and to remaining or venturing any distance from the land after lanes of water have once shown themselves."

The depot at Cape Beechy, with those established on the Greenland coast during March, was sufficiently supplied to enable Lieutenant Lockwood's main party to haul their supplementary supplies from Depot "B" at one load. This left to him the collection at Polaris Boat Camp, in Newman Bay, of the stores at Depot "E" and on the floe in Robeson Channel.

The supporting party camped at Depot "A," near Cape

Murchison, where Lieutenant Kislingbury had thoughtfully preceded them and arranged the tent for their reception. The temperature on arriving was -32° (-35.6° C.), which fell to -41° (-40.6° C.), making their first night a severe one, though it was passed satisfactorily. Their loads were there increased to ninety pounds per man.

They reached Depot "B," April 4th, in six hours' travel, and camped in the snow-house, at which point they were joined by Lieutenant Lockwood, who left Conger that evening, with the dog-sledge.

On the evening of the 5th the entire party left Depot "B," hauling a hundred and thirty pounds to each man and a hundred to each dog. Cape Beechy was reached after about four and a half hours' travel, as Sergeant Brainard says, comparing the time with that made in his previous journey: "An hour and twenty minutes in favor of the Hudson Bay sledge with one hundred and thirty pounds, as against the McClintock with one hundred pounds. The work performed by these (Hudson Bay) sledges is very gratifying to us, the friction being much less than with the English sledge."

Whisler complaining of illness, the party camped after seven hours' travel. Here the field sledge-ration commenced, the alcohol (fuel) allowance (five ounces) of which was not considered satisfactory, barely melting the frozen meat. The fuel allowance of the British expedition, 1875, was four ounces. As the English allowance had been unsatisfactory at times, after consultation with my officers I fixed our ration at four and a half ounces, which was increased, under certain circumstances, to five. Subsequently six ounces were fixed on as a proper ration, and that amount proved satisfactory.

At this camp, Brainard says: "Ralston, cook; temperature about -40° (-40° C.); his duties were rendered very trying

on account of having frozen his fingers during the operation of the morning meal. Our sleeping-bags were like iron, and sleep was out of the question; our teeth were clattering and clashing together in a most dangerous manner. Connell froze one of his toes in the sleeping-bag; it is very sore and considerably swollen, but he, however, intends to retain his place in the drag-ropes; Henry suffering with rheumatism, and says he cannot proceed, and so has been ordered to return to the station. So much for huge men for Arctic service."

The temperature fell as low as -48.8° (-44.9° C.). The party escaped serious frost-bites, except Connell, who was badly frost-bitten on the ball of his foot. Lieutenant Lockwood says: "Henry was suffering from rheumatism, and thought he would have to be hauled back if he went any farther, so I directed him to return to the station. Connell thought he was able to go on; was willing and anxious to try at any rate."

They moved forward from this camp on the evening of April 6th. After Connell had limped along painfully for an hour, he was so done up that Lieutenant Lockwood says: "He had fallen out of the drag-ropes, being hardly able to get along at all. He reluctantly agreed to going back. Leaving the main party to proceed, I left my load and took Connell to Cape Beechy," from which point he thought he could proceed by himself. During the day they fell in with several strips of rubble from young ice, in which the Hudson Bay sledges, entirely unsuitable for such ice, were frequently overturned. The rough, pointed ice damaged the sledges, and other mishaps made travel correspondingly slow and laborious. Lieutenant Lockwood being absent with Connell, Brainard camped, owing to high wind, after seven and a half hours' travelling.

Here Brainard was cook, in a temperature of -27° (-32.8° C.), with a brisk wind. His field journal says: "This morning

the functions of cook are particularly disagreeable, with a strong wind threatening to carry away our tent, and in addition I have to face the scowling countenances of my companions, who gloomily take their breakfasts in the small pannikins. The obvious cause of these half-angry faces is the lack of meat, for which hard bread was substituted. Ritenbenk, the king-dog, ably assisted by Gypsy, the queen, entered the tent while we were sleeping, and carried away the meat already prepared for our evening meal. As no allowance for thieving dogs was made in our scale of provisions, we are compelled to fast until the next meal."

From this camp Lieutenant Lockwood started in advance to do work with the dog-sledge, leaving Sergeant Brainard again in charge of the supporting parties. This arrangement continued until Cape Bryant was reached, as Lieutenant Lockwood employed his time, with the more rapid dog-sledge, in alternately advancing his own load and in assisting the man-sledges.

Shortly after starting the brisk wind developed into a severe storm, which drove Brainard to camp in less than three hours.

Salor and Biederbick, through a misunderstanding, allowed themselves to become separated from the main party, and had to be hunted up in the furious storm by Sergeant Brainard, who finally came upon them, burrowed in a snow-bank, with only a rubber blanket to protect them. He succeeded in bringing them safely to the tent, where the rest of the party were anxiously awaiting them, alarmed as to their safety.

The storm increased to a violent gale, the wind reaching, it was estimated, sixty miles an hour, from which they were partly sheltered by huge bergs immediately to the windward, or their tents would not have stood for a moment. The barometer rose in twenty-one hours over six-tenths of an inch, and the temperature 26° (14.4° C.). The wretchedness of the party was ex-

treme, as the drifting snow, weighting down their already crowded tents, cramped them excessively, and rendered the proper preparation of their meals impossible.

Finally, on the evening of April 9th, the storm abated, when Sergeant Brainard says: "We are anxious to quit this miserable place at any price. We have been in the sleeping-bags about forty-five hours, suffering discomforts that words would fail to convey any idea of, and which can only be appreciated by those who have had a similar experience."

Lieutenant Lockwood was caught by the same storm near Cape Sumner. In passing that point he says:

"Here, instead of the protection I had anticipated from the bluffs, we encountered a series of blasts and whirlwinds of snow, disagreeable in the extreme, and making it difficult to keep the sledge from sliding sideways into the pits formed by the snow adjoining every mass of ice." Reaching a large snow-drift, he continues: "We dug a small hole in the snow-bank and crawled inside," where "how long exactly we remained I don't know; I was glad to leave even before the storm had ceased. . . . We had no light except from some cracks, which closed and opened continuously through some unknown agency, occasionally new cracks forming. This movement was accompanied by a noise which was rather alarming, until I found that our abode didn't decrease in size thereby. On crawling out when the storm had ended, the dogs were almost concealed from view by the snow which had drifted over them."

Near Cape Sumner the supporting party met Lieutenant Lockwood returning to their assistance. The travelling that night was fairly good, and the men were somewhat cheered by the sight of the sun, which then was above the horizon at midnight. After passing Cape Sumner there was so much rubble and broken ice that, on arriving at Polaris Boat Camp, after ten

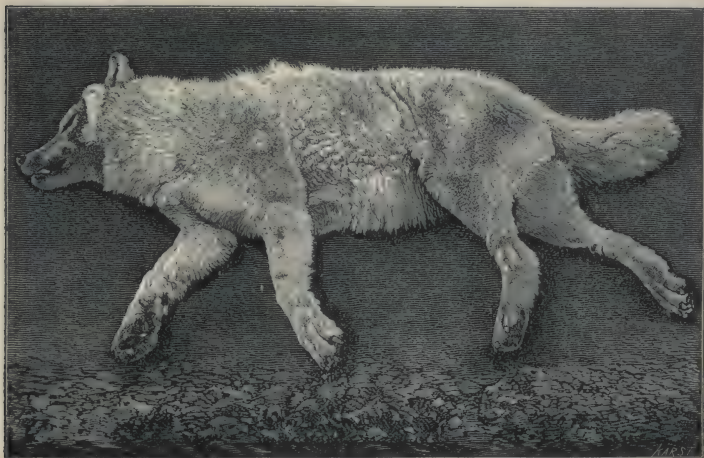
hours' travel, the sledge Beaumont had been so badly injured as to be useless, the bottom being completely worn out by friction over sharply pointed ice.

Violent squalls were experienced at Boat Camp, which broke the poles and blew down the tent, driving the parties eventually to snow-burrows. The wind was so violent that, while at work, the men were frequently blown over, and one gust lifted the dog-sledge, with its load of two hundred pounds, bodily from the ground. The sledge struck Ralston on the forehead, knocking him several yards and injuring him severely. An attempt to cook supper resulted only in the loss of the fuel, and the party lunched on hard bread and frozen meat. Brainard, who was an uncomplaining man of great endurance, says: "We imagine that no other party in the Arctic regions has ever passed through discomforts similar to those experienced by us during the past few hours, which have left us in a miserably forlorn and dejected condition."

The party were at this camp forty hours before they were able to obtain a satisfactory meal. The air-holes in the snow-houses continually filled with drifting snow, and on an attempt to cook a meal the alcohol lamp refused to burn on account of the vitiated atmosphere. As the air-holes filled up as rapidly as made, they immediately dug out the entrance, when Whisler fainted, and others suffered wretchedly from the confinement in such bad air.

As Whisler complained of severe lung pains and commenced spitting blood, and Biederbick was suffering with bladder trouble, Lieutenant Lockwood decided to send them back to Conger. Biederbick, despite his wretched condition, assured Lieutenant Lockwood that he would be responsible for Whisler's safe return to Conger, where they arrived in fair condition April 13th. Connell and Henry had reached the station on the 8th. Dur-

ing Henry's return, which was slightly in advance of Connell, the only personal encounter with a wolf was experienced. He reported that on entering the tunnel to the snow-house a huge wolf met him, and running over his back escaped. Later he claimed to have seen three wolves and that two of them followed him to Dutch Island. Connell met a wolf between Cape Beechy and Depot "B."



An Arctic Wolf, killed near Fort Conger.

[From a photograph.]

The party were employed until the 16th in accumulating at Boat Camp the stores of Depot "E" and those on the floe in Robeson Channel, which was accomplished under very difficult and discouraging circumstances.

A succession of violent gales rendered it almost impossible for the party to do work of any kind. Their tents were repeatedly blown down, their travelling-gear scattered, their sleeping-bags so badly frozen that at times the strength of four men was required to open them; and, worse than all, the conditions were such that the proper preparation of their meals was nearly im-

possible. A new peril also threatened them along the Greenland coast south of Cape Sumner. Sergeant Brainard says: "From the high cliff, huge rocks were blown which came crashing down to the very edge of the floe, endangering our lives and warning us that travelling on the ice-foot was too dangerous to be persisted in. In passing a narrow ravine a beautiful cascade of snow was seen, being formed by the wind rushing violently down a narrow, rocky cut in the face of an abrupt cliff, carrying with it a small and constant amount of fine snow, which leaped from rock to rock, resembling a silver mountain stream falling from a series of ledges."

While this work was progressing, Lieutenant Lockwood, fearing that the runners of the dog-sledge would not last because of the rough ice, returned to Fort Conger and obtained an extra set, which were taken along for emergencies.

While at Boat Camp violent storms, and the scattered condition of the stores, prevented constant watch over the dogs, and they succeeded in stealing about forty pounds of bacon and beef. Fortunately the large amount of stores transported to that point prevented any inconvenience from this loss, which otherwise might have had very serious results. The necessity of packing the meat for the journey in light muslin bags facilitated the theft.

Examining the sledges after this work, Lieutenant Lockwood decided that two were unserviceable, which left but two for further work. He expected to obtain a third at Cape Beechy, but, on visiting that depot, discovered that it had been so misplaced that, owing to the snow, he was unable to find it. In place of the injured sledges, the Nares was extemporized from the extra dog-sledge runners and slats.

One of the violent gales wrenched the cedar boat, cached by Sergeant Brainard at the Gap, from its bed and rendered it un-

serviceable; it must have been lifted bodily and blown a considerable distance, as it was found on the ice-foot.

At 10 P.M. of April 16th, the party started from Boat Camp for their northern trip, taking three hundred rations. Lieutenant Lockwood was in advance, hauling about eight hundred pounds with a team of eight dogs. Then came, second, the large sledge Nares, drawn by Sergeants Brainard and Ralston and Corporal Salor; estimated amount drawn by each man, two hundred and seventeen pounds. Third, the Hudson Bay sledge, Hall, drawn by Sergeant Jewell and Private Frederick; estimated amount dragged by each, one hundred and fifty pounds. Fourth, the Hudson Bay sledge, Hayes, dragged by Sergeant Lynn and Corporal Elison; estimated amount dragged by each, one hundred and fifty pounds.

The average weight drawn by each man was one hundred and eighty-two pounds, and by each dog one hundred pounds. The "constant weights" of the dog-sledge were two hundred and forty-three pounds, and of the remaining sledges three hundred and seventy-five pounds.

Eight hours' travelling brought the party to what was supposed to be the mouth of Gap Valley, but it eventually proved to be a ravine (Rocky Gorge) considerably farther to the eastward. Here they camped.

After tremendous exertions, consequent on the overland travelling, the entire party reached the sea-coast a little to the eastward of Repulse Harbor, on the morning of April 22d, after five days' travel. Their journey was much prolonged, and their difficulties increased, by their error in regard to the Gap Valley. They travelled instead through Gorge Creek and Lost River Cañons, a series of tortuous, winding ravines, which greatly lengthened their route, as well as taxed their strength by compelling them to cross a divide of considerable elevation

above the sea. On the 20th of April the temperature in these ravines fell to -40° (-40° C.), an unprecedentedly low temperature for such a late season of the year.

The character of the route passed over is shown by the following extracts from Lieutenant Lockwood's diary. On the 17th of April he reconnoitred Rocky Gorge, the grade of which was at first easy. The following day he says: "We came to the narrow gorge referred to. Its vertical sides were but a few feet apart; under foot the stones were exposed. Passing this the stream-bed widened and ran between sloping hills, but we encountered at the same time deep, soft snow. This was the general character of the travelling—ravines with soft snow, varied by gorges at intervals, with exposed stones and fragments of rocks. The stream is very tortuous, but the grade very slight its entire length, except when interrupted here and there by low banks of drifted snow. Its general course, as near as I could judge, is southwest."

"April 18th we came to a fork of the ravine coming in from the north; the first branch of the main stream which seemed to offer a practicable route to the north. One or two had been passed, but they were so narrow and steep—mere gullies—as to forbid the assumption that they formed part of Lieutenant Beaumont's route. It was the route of this officer, as laid down on his map, that I was endeavoring to follow. However, I continued on, but a few hundred yards beyond, seeing the stream bearing decidedly to the east, I left the sledge, and, ascending a low slope to the left, soon found myself in a 'divide' very similar to the 'divides' of the western prairies. To the north the 'breaks' of water-courses running in that direction could be seen. On the slope alluded to I saw a bird, to which Frederik gives the Eskimo name for eagle; was unable to get a shot. . . . A short distance beyond found my-

self on a level plain, its broad expanse stretching out for miles all around. The weather was overcast, threatening snow, but I could see the 'breaks' to the north, and after an hour's travelling reached them—the snow affording very good travelling—to find myself in a water-course quite broad and offering a very good route; the snow was generally hard; but few stones were exposed to view through it. The general course of the stream seems northwest; it is very picturesque. About 7.15 A.M. I came to what looks like a gateway opening into a street, a cañon running east and west, and so level that it was with many doubts I concluded *to the left* was down stream (Lost River)."

On April 20th, in a reconnoissance to determine his exact location, he says: "After proceeding half a mile the cañon changed into a wide valley, bordered by sloping hills, which, at a little distance back, assumed the proportion of mountains. Passing the point of a hill, which hid the view ahead like a cape, the valley was seen to continue on in a direction a little north of west until closed up entirely, apparently by a low range of hills. At 11.45 A.M. we reached this place, and found a narrow gap. I here delayed thirty minutes and ascended a hill, but could see little save another valley-like expanse ahead, which seemed to turn to the north. In half an hour more we were opposite this opening to the north, and saw the floebergs lining the long-looked-for coast. On our right and left were low, sloping points about half a mile distant from each other; behind us was a semi-circle of hills and mountains, and before us a level delta of bare stones. A few feet more in the elevation of the polar basin would make a bay of this place; it was doubtless the bed of one some time in the past."

Proceeding toward the sea Lieutenant Lockwood says:

"About a half mile from the coast I found an old piece of

drift-wood about six feet long, four inches wide, and four inches thick, pine or fir apparently, and evidently split from the body or branch of a tree. It was partially buried."

Sergeant Brainard's field notes speak of the journey as painfully laborious. April 18th he says: "Men all very tired; Jewell especially appears badly used up, although he displayed plenty of pluck in remaining in the drag-ropes to the last moment." They were obliged to double up their crews, travel three to five times over the road, and he continued, "to add to our discomforts, aside from the severe strain of tramping through snow knee-deep and more, there was a high wind with snow blowing directly in our faces. . . . Besides, the crust breaks just as we put our weight on the drag-ropes for a strong pull; this taxes the strength severely, and will soon break down the hard workers." April 19th: "The sledge often sinks to the slats, making it necessary to resort to standing pulls. . . . Nares, the improvised sledge, dragging on slats almost constantly, but Hudson Bays glide over snow without sinking much."

The lime-juice pemmican, so highly recommended by theoretical authorities, proved very distasteful, and could only be eaten raw; and, then, between the frozen lime-juice and solid meat their lips and mouths became sore.

Brainard writes: "The majority of the party complain of sleeping cold, and the rest assert that they obtain no sleep at all. This no doubt is owing to the condition of the sleeping-bags, which were frozen so badly on camping this morning that three men were required to unroll them, and we were obliged to thaw ourselves gradually into them." April 21st: "We encountered sand-bars and gravel-beds, which could not be avoided, and necessarily our labor was very severe and tedious, and frequent standing pulls became necessary. This with a north-

east wind of about twenty miles an hour. . . . Advanced the remaining Hudson Bay sledge in face of a terrific gale, which drove the flying snow against our faces with a force and power equal to handfuls of gravel thrown by the strongest arm. This caused a painful smarting sensation, so intense as to be one of our most disagreeable experiences. The party is much worn out by the extra work. I think eight hours' labor sufficient, and hereafter will confine myself strictly to that, except under special circumstances."

On the morning of April 22d the entire party again camped together, in the face of a raging storm, on the lee side of some huge floebergs a short distance to the eastward of Repulse Harbor. Lieutenant Lockwood's party, despairing of getting their large tent to stand, pitched their small shelter-tent, which would hardly hold them on account of the rapidly drifting snow which soon covered it. "While at supper," says Lieutenant Lockwood, "some of the dogs thought my bag a good place to rest, and we returned to find it covered with snow. Remained in bag the rest of the day, missing supper in the large tent."

Sergeant Brainard, enumerating other discomforts, says:

"Our position while sleeping (?) is necessarily very cramped, the sleeping-bags being at half-mast, *i.e.*, our bodies on the ground and our legs run up against the tent-pole, and even then only about half our bodies can be inserted. Wind is estimated at forty miles per hour. The trials of an Arctic cook are numerous and irksome, sorely trying to the patience and temper of those called to that office. After the fierce storm had slightly abated, 'Shorty' (Frederick) found the cooking apparatus all correct except the fuel, which was outside under a huge drift. The deep drifts not only covered the sides of the tent, but also completely closed the entrance, making it necessary for him to tunnel his way through to get outside, where a

new difficulty arose. The fuel was under four feet of snow, which also covered the shovels. Despite the high wind that, sweeping around the berg, threatened to blow him away, he was not a moment discouraged; but, with bare hands, commenced manfully digging into the hard drift, occasionally uttering a deep groan, and calling down maledictions on Arctic work in general. His meal, however, was an excellent one, and, after getting warmed thoroughly over the lamp while cooking, he seemed to forget all his recent troubles, and the bright side of his usually genial nature came bubbling to the surface."

"The storm raged till early morning of the 23d. . . . The dogs ate up all the bacon left, about twenty pounds, and about half as much English beef, during our sleep. It was packed on the Nares, and out of their reach it was thought."

A runner of the dog-sledge broke near this camp, and in moving forward, on April 23d, it was necessary to replace it by exchanging runners with the Nares. Sergeant Elison succeeded in repairing the runner for the Nares, but it gave way completely in a rough place, and the load was moved forward by lashing together the two Hudson Bay sledges and putting on it the loads previously carried by the three sledges. This improvised sledge was hauled only with great effort, as it dragged like a harrow. They camped about a mile west of Black Horn Cliffs, at a point where they were driven from the ice-foot to the main floe, to reach which they were obliged to cut a route for a half mile or more through adjacent rubble-ice.

"At and beyond Drift Point," says Lieutenant Lockwood, "the snow-slopes and soft snow were met with, and it became necessary to 'double-up,' *i.e.*, advance by half loads."

Sergeant Brainard's field notes of the same march record:

"Not far from camp I found a seal-hole newly made, and

traces of that animal in the snow which had lately fallen, showing that he had become alarmed at our approach, and had sought safety under the ice. . . . After passing Drift Point we encountered snow-slopes, which made progress slow and tedious, and drove the party in despair alternately to the tangled rubble-ice and the sharp, difficult snow-drifts. The slopes are formed by the snow blowing from a rather abrupt hill to a ridge of gigantic floe-bergs grounded at its base, filling entirely the intervening space, except next the bergs themselves, where the eddying wind prevents the snow from drifting in. These clefts, from fifteen to twenty feet deep, and at a sharp incline, make the snow-slopes very dangerous surface to travel over, as the sledge is liable at any move to escape the control of those who are hauling it and slide into this deep space, even if it does not drag down the unfortunate sledge-men."

Sergeant Brainard's experiences illustrate the great distance at which high land can be seen on clear days. From the eastern end of Black Horn Cliffs, on April 24th, he says: "The clear pellucid nature of the atmosphere was such that Capes Sheridan, Union and Black Cape, as well as several points in the United States range of mountains were seen, the distance being nearly fifty miles. . . . Temperature 11° (-15.6° C.). The hot blazing sun is thawing the surface of the black, dirty snow near the cliffs, and in consequence our moccasins are completely wet through."

About this time my letter was read to the party by Lieutenant Lockwood, in which I promised a conditional reward of \$900 and upward, contingent on making a northing surpassing any ever before attained. Lieutenant Lockwood offered fifty per cent. additional reward. The amount was to be distributed in such proportions as Lieutenant Lockwood should judge each man's work merited. I doubt if the question of reward ever

entered into any man's thoughts during all the extraordinary suffering and exposure to which this journey subjected him, but it seemed a proper intimation that success would be in some way rewarded.

The Appropriation Committee of the House of Representatives, on a statement of the case by me, after my return, reported favorably as to the assumption of both these rewards, and Congress so enacted.

They started on their tenth march, April 24th. I quote from Lieutenant Lockwood's journal: "Opposite Black Horn Cliffs, and extending a short distance this (the west) side, was a clear, smooth floe of ice (formed last year, I suppose), over which, with a heavy wind on our backs, we made rapid progress. When opposite the farther (eastern) end of the cliffs, and some distance from shore, farther advance was stopped by a considerable mass of rubble-ice." Finally, I found a route—somewhat circuitous—to the shore without much difficulty, and continued on over a smooth, level floe (last year's [?]), which extended half way to the gorge. The rest of the way a good route was found on a hard, gently sloping snow-slope, inside the line of bergs and hummocks which here commenced to fringe the shore. I saw two ptarmigan in winter plumage along here. I found no cairn or provisions, though I went half a mile beyond the gorge. The violent wind made my return slow and very uncomfortable."

They camped east of and close to the Black Horn Cliffs.

On the morning of April 25th the party were delayed a few hours by the illness of Eskimo Frederik, who complained of stomach trouble. Lieutenant Lockwood finally managed to get him as far as Rest Gorge, about two and a half miles to the eastward of Black Horn Cliffs, where he put him in the sleeping-bag and gave him a drink of whiskey. There they camped.

Sergeant Brainard writes: "We have no way of knowing exactly what ails him, and he has no way of making known his wishes except by sighs, which is a very unsatisfactory method of talking. Not knowing of any other remedy, a huge drink of hot brandy was given him, and we soon had the satisfaction of learning that he was sleeping soundly, which report was afterward confirmed by hearing him snore loud and deep enough to almost cause the ice-foot to vibrate; hopes were then entertained of his speedy recovery. . . . The map of this coast made by Lieutenant Beaumont is a model of accuracy and correctness . . . as far as we are able to discover. The two sledges Hayes and Hall are now almost worn out and very hard to drag."

During the afternoon Ralston and Jewell succeeded in finding the English cache at Stanton Gorge; it was marked by a cairn on a hill somewhat back from the coast, and in a position which did not show up well to the westward.

"Before starting," (April 26th) says Lieutenant Lockwood. "we built a cairn here, and left one day's rations for entire party and the dogs, and also everything in the way of clothing, foot-gear, etc., that could be spared.

"At Stanton Gorge, Sergeant Ralston showed me Beaumont's cache, which was situated upon a 'shoulder' of the mountains about a hundred feet high. This cache consisted of forty rations, fifty-six pounds sweet pemmican, ten pounds bacon, and a metal box containing the hard bread, potatoes, etc.; also a can of rum which Sergeant Ralston had brought down to Rest Gorge the previous day. I built up the cairn again, and left a record of my movements to date, and took the rations to the ice-foot, in order that they might be convenient to the dog-sledge on its return, for I thought it desirable to take them on to Cape Bryant."

That evening the party camped near Frankfield Bay, when Lieutenant Lockwood records: "The route from last camp led us, as far as Cape Stanton, inside a line of floebergs on a snow-slope quite steep in places, but generally hard on the surface, and offering fair travelling. As an exception, however, it should be stated that there is an ice-foot for some little distance at Stanton Gorge. The travelling over Hand Bay was also quite good."

At this camp writes Brainard:

"Temperature -23.5° (-30.8° C.). Very few of the party obtained any sleep, owing to low temperature and frozen sleeping-bag, in which much frost and dampness has accumulated the past few days."

At 7 A.M., April 27th, the party left their camp opposite Mount Lowe and marched to Cape Bryant.

Lieutenant Lockwood says: "Travelling rather heavy (over snow-covered ice-foot). At 9.25 A.M. reached east shore of Frankfield Bay. On the way the snow was generally hard and good. From here the only route, or at least the best route forward, was over the foot of a hill, the ascent rather steep, and the slope quite so; the snow on it had packed hard and smooth."

"I saw four ptarmigan and killed three with the shot-gun. Frederik had, some time before, when by himself, killed two with the pistol. This pistol, which had a wooden stock, similar to a gun's, fixed to it, was habitually carried on the sledge."

"The travelling since leaving Frankfield Bay has been along a low fore shore, excepting two or three indentations of the coast where we crossed old floes. Along the shore we travelled over a snow-covered ice-foot, or what is generally called an ice-foot (?); sometimes *good* and sometimes *bad*, never *very bad*. Over the floes referred to it was generally quite fair."

The main party reached Cape Bryant, 8 P.M., April 27th,

temperature -14° (-25.6° C.), after over eleven hours' steady work in the drag-ropes. Not only were they all nearly worn down by the exhausting effects of previous hard work and exposure, but Sergeants Brainard and Ralston had been suffering from snow-blindness, and Private Frederick from an injured knee. The party consequently remained at Cape Bryant April 28th, recuperating and preparing for further work.

Lieutenant Lockwood decided to send back the supporting party, and advance with the dog-sledge and two men. He writes:

"Personally inspected the Hudson Bay sledges, and was confirmed in the declaration of all the men that they were entirely unserviceable for further use. One I cut up and made slats for the dog-sledge; the other was repaired sufficiently to carry the *constant weights* of Sergeant Lynn's party on their return to Boat Camp."

"After this I built a cairn on the slope of the hill, perhaps a quarter mile from the shore, and deposited inside the forty English rations, all our own that were surplus, the gun, etc., and everything I thought we could do without. I also left a record. Sergeant Brainard suffered severely from snow-blindness during the day and had to remain in the tent."

"Cape Britannia was dimly visible; later in the day it was quite distinct. The view is so well represented in Lieutenant Beaumont's journal, that I will not attempt to describe it. Sergeants Brainard, Ralston, and Elison went along the coast to the south to find Lieutenant Beaumont's cache, or cairn, but were unsuccessful."

From the summit of Cape Fulford, which was visited by Sergeants Ralston, Elison, and himself, Sergeant Brainard says: "The east side of Sherard Osborn Fiord, with its mountains and capes, was distinctly outlined, and appeared much nearer

than the distance given on the map. The appearance of the ice in the fiord encouraged us very much. Its surface has an undulating appearance peculiar to ice which seldom breaks up, and is studded here and there by small hummocks." The zeal and activity of the members of this party could not be more strikingly illustrated than by their tramp of twelve miles on a resting day, in such a country, in order to familiarize themselves with their surroundings.

The journey of Lieutenant Lockwood's supporting party, which here terminated, was an extraordinary one, considering the character of the ice, the loads drawn, the stormy weather, and the temperatures to which they were subjected. In his noted journeys, made about six hundred miles farther south and over ordinary ice, the famous sledge-traveller, McClintock, averaged only two and a quarter miles daily more than this party.

The experiences of McClintock, more varied than of any other Arctic explorer, show the advisability of sledging with dogs. In seven journeys, covering over three thousand miles, his men travelled eleven and one-third miles daily. With both men and dogs he later averaged twelve and a half miles daily, and with dogs alone twenty-four miles daily. The comparison between the man-system, under an officer of extraordinary energy—Lieutenant Beaumont—and the mixed system, which I followed perforce, should also be convincing in favor of dogs. Lieutenant Beaumont made his trip from Discovery Harbor (Fort Conger) to Cape Bryant in thirty-one marches, travelling via Floeberg Beach, and with a mean temperature of -13° (-25° C.), ranging from 14° (-10° C.) to -45° (-42.8° C.). He travelled one hundred and eighty-three miles to make his distance of one hundred and thirty-four miles.

Lieutenant Lockwood's supporting party travelled from Conger (Discovery Harbor) to Cape Bryant, via Polaris Boat Camp and

Gorge Creek, in eighteen marches, with temperatures ranging from 14.5° (-9.7° C.) to -48.8° (-44.9° C.), and a mean of -11° (-23.9° C.). They marched about one hundred and sixty miles to pass over their route of one hundred and twenty-one miles.

The difference between the six miles made daily by Lieutenant Beaumont's men and nine by Sergeant Brainard and his associates resulted from the contrasted loads, especially the constant weights. It was the unanimous opinion of my men that they were worked up to their last pound of strength, and that the weight of two hundred and twenty-five pounds per man, hauled by Beaumont from Repulse Harbor, would have broken them down.

The abandonment of one sledge and caching certain useless articles reduced the constant weights of our men to forty-seven pounds at Black Horn Cliffs. They were farther assisted on their totals by Lieutenant Lockwood with the dog-sledge, on special occasions where bad travel obliged doubling up, which somewhat reduced their labor.

Lieutenant Lockwood marched with dog-sledge from Conger to Bryant in thirteen journeys. He travelled two hundred and ninety miles, although the distance was but one hundred and twenty-one miles, the remaining travel being in doubling up or in side journeys. His actual marches averaged eleven hours each, during which he made twenty-two miles daily.

Fourteen to fifteen hours of daily work and exposure, in storm with driving snow, or with clear, balmy air, and zero temperatures, brought them to Bryant at that early day, and made success seem certain.

CHAPTER XIX.

THE FARTHEST NORTH.—CAPE BRYANT TO CAPE WASHINGTON.

JOURNEY OF LIEUTENANT LOCKWOOD AND SERGEANT BRAINARD.

APRIL 29th Sergeant Lynn turned back for Polaris Boat Camp with the supporting party, while Lieutenant Lockwood, with Brainard and Christiansen, turned his face northward over the frozen sea.

“I selected Sergeant Brainard to accompany Frederik and myself,” says Lieutenant Lockwood, “and made up a list of seventy-five rations, sufficient for twenty-five days’ absence from Bryant, viz.:

	Pounds.
Pemmican (lime-juice).....	40
Musk-meat (frozen in tins)	34
Sausage and English beef	17
Beans, Boston baked	19
Potatoes, evaporated	5
Cranberry sauce (three cans).....	4½
Tea.....	2
Chocolate.....	3
Sugar.....	10
Lime-juice (frozen in cakes)	2½
Hard bread	60
Milk.....	1½
Alcohol	19
Total	227½

“The constant weights, etc., consisted of 1 ‘A’ tent, poles and pins; 2 sleeping-bags (one buffalo and one dog-skin), 1 cook-

ing-lamp, 1 rubber blanket, 1 axe, 1 spade, 1 hatchet, 1 pistol, 1 sextant, 1 sledge-runner (extra), 1 shelter-tent, 1 small cooking-lamp (extra), 2 pairs of snow-shoes, 1 catch-all bag, containing ammunition, cups, plates, spoons, sounding-line and lead, brush, record-cases, tin funnel, measure cup, chopping-board, etc.; 3 clothesbags (individual weights given elsewhere), and sledge (80 pounds). Total constant weights, 256 pounds.

“Dog pemmican (3 sacks) 300 pounds; total amount drawn by 8 dogs, $783\frac{1}{2}$ pounds; or an average for each dog at starting of (about) 98 pounds.

“At 4.47 P.M. I left with dog-sledge, Sergeant Brainard, and Frederik (Eskimo), taking a course toward Cape May. The weather continued delightful. Found the floes quite hard and level, interrupted only by occasional low detached hummocks, on which the drifted snow made our progress very satisfactory. When nearly opposite Dragon Point, however, the snow-crust seemed to weaken, and the sledge frequently sank to the slats, requiring our united exertions to move it.”

Brainard's field notes say: “The dogs, not being accustomed to hauling such heavy weights, sit down as soon as the runners cut through the crust, . . . and complacently watch us, with a puzzled expression, . . . until we lift the sledge bodily and place it on the firm crust.”

On April 30th, Lieutenant Lockwood, at “1 A.M., camped opposite Dragon Point, the dogs being much exhausted by such a heavy load. The clearest day I have yet seen; no wind. Temperature lower than usual. 4 A.M.: Finished supper. 4.20 A.M.: Thermometer, 1° (-16.7° C.); barometer, 29.35. Halts during march for relashing, about thirty minutes in all. Lieutenant Beaumont's sketches and descriptions of this section are very good, as well as I could judge by the eye.”

At 5.22 P.M. he again started, and soon found “the dragging

very heavy and fatiguing, snow sometimes knee-deep, the sledge coming to a stand-still repeatedly. On these occasions the dogs complacently sit on their haunches and observe the operation of pulling it out, which falls to us. After dropping half the load the travelling seemed to improve, due, possibly, to a slight change of direction, which brought us on a line with Cape Britannia. Sergeant Brainard quite over his snow-blindness. We find the lime-juice pemmican very unsatisfactory, and eat it only with great reluctance. Cape Britannia is very distinct, due, probably, to the remarkable refraction of the atmosphere. Beaumont Island presented the appearance of one island on top of another, the first inverted. 4.15 A.M.: Turned in."

At 4.25 P.M., May 1st, they started with whole load, but Lieutenant Lockwood soon dropped half with Brainard, and, going on himself, "stopped at an old floeberg, and, taking off load, sent sledge back for remainder. Character of the ice better, so that I have determined to try hauling everything at once. The floes in sight very large, broken at long intervals with ranges of low hummocks; isolated mounds scattered here and there. All covered with snow. The floes in places are slightly undulating. 7.48 P.M.: Thermometer, -1° (-18.3°C.)."

Lieutenant Lockwood during that march gave up all idea of visiting Cape May, as he found the roads better to the north, and travelled direct for Cape Britannia. He camped "hardly more than five miles from Cape May. The large floe last referred to extends north as far as I could see. Supper consisted of tea, lime-juice pemmican, hard bread, and a stew (?) of beans and cracker-dust; the allowance of alcohol only sufficient to melt the ice and warm the water; the stew was cold. 9.15 A.M.: Turned in."

"Brainard and I didn't sleep much. The Eskimo invariably snores two minutes after he composes himself to rest. Took a

number of compass bearings of different points very carefully, and was disappointed to find the instrument no better than before. I had spent some time yesterday in trying to mend it. There seems to be a want of magnetism."

They started north at 8 P.M., May 2d, but twenty standing pulls in as many minutes obliged them to drop half the load. Shortly after Lieutenant Lockwood "attempted a sketch of Stephenson Island—an island to all appearances from here. Saw wolf and fox tracks going north some distance back. Noticed a line of hummocky ice extending from Beaumont Island in the direction of Cape May. Doubled up just in time, the travelling since,



Stephenson Island from Cape Britannia.

[From sketch by Lt. Lockwood.]

up to this spot, being soft and deep, sometimes nearly up to the knees. 10.45 P.M. came to a crack in the ice, which seemed to follow the lines of hummocky ice referred to. This crack, when first met, was in width the length of a tent-pole, and full of free water and 'sludge' about two feet, as I remember, below the level of the edge of the ice. Following it south a few hundred feet, we found two or three cracks, but only two feet or a little more wide, so there was no difficulty in crossing. This place was at the intersection (approximate) of a line from Cape Britannia to Cape Bryant with another between Cape May and Beaumont Island. This being a good opportunity to get the



depth, I sent Frederik back for Sergeant Brainard and the load—the lead and line not being with me.”

“May 3d, 1.07 A.M.: Dog-team back again. The dogs always travel much faster going back or forward over a trail. Selecting a good spot, I gave Sergeant Brainard the line; it ran out its full length without touching bottom. I then attached in succession four coils of seal-thong, a long piece of rope, and finally Frederik’s whip; all with the same result, no bottom. Having nothing now left but the traces of the dogs, we began drawing the line back, while considering if these should be risked. I had attempted to measure it *exactly* by arm-lengths as it went down, but found this inconvenient and decided to wait till we got it all out. We drew out the whip and part of the rope, when the latter suddenly parted, and of course the rest was lost. The rope was about half an inch in diameter, and would hardly be thought the first part of the line to give way. The approximate length of line below surface is as follows: Rope, including whip, 148 feet; four coils thong, 240 feet; four cod-lines, each 108 feet—432; total, 820 feet. Weight of lead six pounds. Thus, besides the loss of the line, all farther attempts at sounding were prevented.”

Of the tidal crack Sergeant Brainard’s notes say: “At this point (the first reached) the crack opens about six feet wide, and branches a short distance to the north into three distinct openings, each of about the same width as the main one. This would seem to indicate that some strong current from the Greenland shore existed, for this is firm ice apparently wrenched apart by some strong movement of the sea.”

Lieutenant Lockwood writes: “At 2 A.M. proceeded en route with half load. In the course of a quarter of an hour passed a narrow line or belt of low hummocks seemingly parallel to the ice-crack. After this was an immense level floe, which extended

to the right and left and ahead as far as I could see; it was difficult to perceive the smallest break or unevenness in its great expanse. At 3 A.M. met a little mound of snow-ice, which, as it saved the melting of snow for water, I camped alongside of. Bearings from this camp: Beaumont Island east-southeast; Cape Britannia southeast by south; Stephenson Island southwest by south; Cape May northwest by west (all magnetic). At 5.30 P.M. thermometer 19 ($-7.2^{\circ}\text{C}.$). These bearings were from a pocket-compass that Lieutenant Lockwood used after finding the prismatic compass to be unserviceable.

They started at 6 P.M., May 3d, and at "8.28-8.35 P.M. stopped for rest at a line of very low, hummocky ice, which sweeps in a curve to the northeast on one hand, and on the other to the southwest toward Cape May. The floe we now saw before us was an unbroken expanse of level snow, and seemed to continue thus and occupy the whole space between Beaumont and Stephenson Islands and Cape Britannia, reminding me very much of the plains of the West; crust quite hard and firm, enabling us to carry everything at once. At 9.35 P.M., intersection of route with a line between Beaumont and Stephenson Islands."

After fourteen hours' travel, during which they travelled thirty miles to make good fourteen, the party camped within about five miles of Cape Britannia.

Sergeant Brainard at this camp records: "Cape Britannia is now within our grasp. . . . We got into our damp, cheerless sleeping-bag with lighter hearts and in a more amiable frame of mind than for weeks. Even the dusky Greenlander has imbibed some of our spirit (doubtless inspired somewhat by Lieutenant Lockwood's recent promise of a hundred crowns if he reached Cape Britannia), and, sitting up in his dog-skin bag, takes mental note of everything which passes, with a delighted grin

overspreading his shining, good-natured countenance. . . . Stephenson Island is a very high rocky mass, oblong in shape, with nearly vertical cliffs, notched here and there by deep ravines, from two of which pass small glaciers, one nearly discharging. The remainder of the coast to Britannia is broken and mountainous, with two or three glaciers."

"The dogs during our sleep got at the pemmican, which was buried as usual under the sledge, and ate their allowance for two and a half days." *

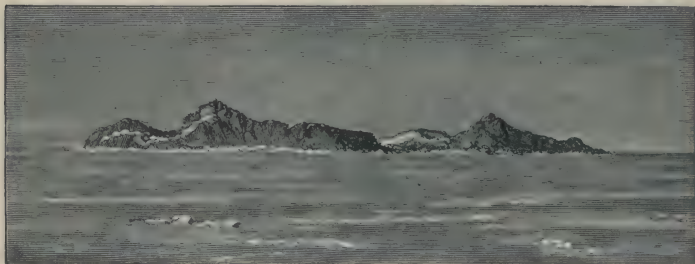
An hour and a half of good travel, on May 5th, brought them to land before untrodden by man, and thenceforward everything was doubly new.

"At 7.53 P.M.: Reached Cape Britannia; the line of demarcation between the floe and the shore-ice was very slight, and only indicated by one or more indistinct cracks. After pitching the tent on the ice-foot, we proceeded to build a cairn about seven feet high, twenty or thirty yards above, on the side of a little ravine just below the cliff. In it I deposited a record of my journey, five days' rations, three days' dog-food, the extra sledge-runner, shelter-tent, little lamp, and the snow-shoes. The last three articles were brought along in case the snow east of Cape Bryant was too deep to allow the dog-sledge to travel. I now judged we could get along without them. After this I took an observation for latitude. Frederik came in with a ptarmigan; it had commenced to change its plumage; some of the feathers were black."

"May 5th, 1 A.M.: Thermometer, 2° (−16°.7 C.); barometer, 29.52; calm. Sergeant Brainard and I started for the top of the cape or mountain. We followed the water-course referred to; the ascent was quite steep, with several intermediate crests or

* All quoted passages are from Lieutenant Lockwood's field journal, unless otherwise stated.

ridges, each seeming from below to be the top. At 2.35 A.M. reached the summit. Thermometer, $14\frac{1}{2}^{\circ}$ ($-9^{\circ}.7$ C.); barometer, 27.32; windy. We were apparently on an island; its most northern limit ended in a bold headland, Cape Frederick, a half dozen miles distant. Away to the northeast, or a little south of it, was a bold headland—some fifteen or twenty miles off—the termination of a promontory or island stretching to the north. Between it and me were the projecting capes of three similar bodies of land, farther to the right—all separated by great fiords (Nordenskjöld and Chipp Inlets) stretching to the south, and overlapping one another, so that little could be seen



Beaumont Island from Cape Britannia.

[From sketch by Lt. Lockwood.]

to the south of them but a confused mass of snow-covered peaks. Glancing around toward the north and west, the eye rested on nothing but the ice-pack till Beaumont Island was reached; after that the mountains near Cape Bryant.

Stephenson Island is evidently an island (previously doubtful), for the opening of a fiord (Nares) that separates it from Cape May can be seen, and on its east is an immense fiord (Victoria) running to the south. The two fiords are to appearances connected; no land visible at the head of the large one. To the east the coast trends to the southeast, forming with the south side of Britannia coast an immense funnel, ending in a

fiord. All to the south is an indistinct mass of snow-covered mountains. We built a cairn on the summit (one thousand nine hundred and fifty feet above the sea) and deposited a record."

Brainard says: "Recent traces of hares, foxes, lemmings, and older traces of musk-oxen discovered. . . . The abrupt, rugged nature of the cliffs to the westward would not admit of their being scaled, so we followed a deep, narrow ravine to the southward. . . . In the interior a succession of lofty mountain peaks were visible, some of great elevation. They were not arranged in a chain, but formed an irregular, ill-defined mass. Deep snow covered their summits, and an occasional glacier of moderate dimensions could be seen struggling toward the sea from out of the chaotic mass of snow-capped mountains."

The twentieth march, on May 5th, enabled them to round Cape Frederick and camp opposite Nordenskjöld Inlet. Travel was first along an excellent ice-foot, but heavy ice, crowded against the high, abrupt cliffs, soon drove them to the main floe. During their march a deep, grinding noise indicated movement of the floe-ice, the Eskimo being positive such was the case. Lieutenant Lockwood going seaward to investigate, "saw the tide-crack, evidently a continuation of the one crossed west of Britannia." Beyond Cape Frederick they struck "last year's ice; it continued some distance and reached to the north several hundred yards from shore. From Cape Frederick the tide-crack continued toward Cape Emory, curving to the right *en route*. It was plainly marked by a line of heaped-up, hummocky ice, and by being the line separating the smooth and generally level floes inside from the rough pack without. . . . All inside the ice-crack seems one unbroken floe, smooth and level, assuming an undulating surface in most places near the ice-crack, caused by ranges of hummocky ice covered

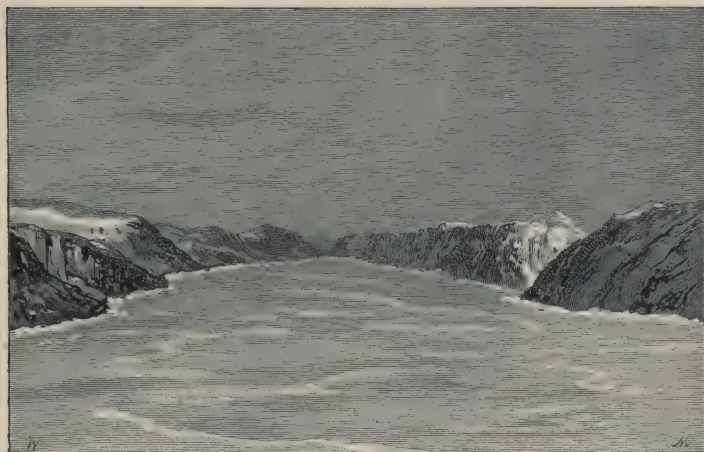
with snow-drifts." Lieutenant Lockwood got as the result of his latitude observations $82^{\circ} 51' N$.

Near this camp Brainard says: "An exclamation from Christiansen caused us to look around and halt the sledge. We were astonished to observe unmistakable signs of open water—the bright rays of the sun playing over the rippling surface of an open pool. . . . At the point we examined, it was about a hundred yards wide, and looked as if it had been kept open during the winter, as none of the *débris* had attained any considerable thickness. Christiansen visited the pool later for seal, but saw no signs of any. Fresh fox and hare tracks seen by me near Cape Frederick. After camping, the dogs were running about like ravenous wolves, gnawing at everything, and badly chewed and splintered the thermometer-box before it could be secured. The ptarmigan lately shot was placed on the ridge-pole for safety. A hasty rush of feet, and a heavy body striking violently against the tent, caused us to rush out to investigate this commotion. The ptarmigan was missing. A few feathers in his bloody jaws marked the king-dog, Ritenbenk, as the thief, notwithstanding his bland look of innocence." Brainard's moccasins here gave out, after thirty-three days' steady wear.

Their twenty-first march carried the party to Cape Benét, the western entrance of Mascart Inlet, which was reached 11.33 P.M., May 6th, after over ten hours' travel, which exhausted both men and dogs. During the march the tidal crack was frequently seen and varied from one to a hundred yards in width, being "covered with new ice, except when broken by pools or lanes." Markham Island was apparently separated from the main-land to the northeast by a narrow, deep fiord. Brainard noticed three small glaciers on the shores of Chipp and Norden-skjöld Inlets which nearly reached the sea.

The following notes of Sergeant Brainard are of interest in connection with Lieutenant Lockwood's statement, that no distinctly palæocrystic ice was seen to the northward or eastward of Cape May:

"The ice met with on this coast appears to be of an entirely different character from the large floes and floebergs so familiar to the traveller on the Grinnell Land coast. The hummocks are all of small size, and no large floes or bergs are met with. Huge masses of ice form a wall which rises along the shore at



Looking into Chipp Inlet.

[From sketch by Lieutenant Lockwood.]

all prominent headlands. It is most likely formed from large quantities of rubble-ice being forced up by the tremendous pressure of the polar pack, and subsequently cemented by the summer sun into a compact mass resembling one immense block of ice."

This camp proved prolific in animal life, thus indicating a luxuriant vegetation near. Two ptarmigan were flying around, a hare was captured, and traces of foxes and lemmings observed.

Tracks of a passing bear, going to the northeast, were seen on the ice-foot, and "abundant traces of musk-oxen were discovered, proving that these animals frequent this place in considerable numbers, though the indications were not of recent date."

"The only excitement and recreation," says Sergeant Brainard, "experienced since leaving Bryant occurred this morning shortly after arriving in camp. It happened in this way: While cutting ice for cooking purposes, I saw a hare on the slope just above me, and fired twice without effect. Frederik, evidently very much disgusted at my lack of marksmanship, took the gun and wounded him twice, and immediately followed up his advantage with a shower of stones and Eskimo epithets. After an exciting chase of over half an hour along the rocky slope, in which the lieutenant and myself joined, the hare was captured."

Before starting that evening three days' rations were cached.

The twenty-second march carried them, May 7th, to Low Point, $83^{\circ} 07' N.$, which was of equal latitude with the most northerly land ever before reached—Cape Columbia, Grinnell Land, by Lieutenant Aldrich, R.N., 1876. Soft, deep snow, sometimes to their thighs, made it the worst and most exhausting travelling since leaving Brevoort Peninsula. Distant Cape was passed, "a grand headland of dark-looking rocks forming a huge cliff," and far in advance appeared Cape Ramsay, which at first was thought to be an island, but the thick snow which had fallen during the whole march rendered it uncertain. The only sign of life was a snow-bunting, the first seen, although they had been heard before. The tidal crack was open along their route the whole day. Lieutenant Lockwood says: "Brainard and I very tired; we both remarked a frequent feeling of lassitude and weakness of late."

A fine march (the twenty-third), during which the dogs trotted at times, brought them, in seventeen miles' travel, to

Pocket Bay, east of Cape Mohn, $83^{\circ} 10' N$. The fine travelling encouraged the travellers, notwithstanding the high wind and drifting snow. The land, which had been running due east, now trended decidedly to the north, the much desired direction. A lemming was caught during the march in Jewell Inlet, about $83^{\circ} 9' N$.

"At this camp," says Sergeant Brainard, "the thieving propensities of our canine friends were developed to an unusual degree. While we were sleeping they burst off the strings, entered the tent, and stole our provision-bag and hare. They were so elated over the success of their raid that they forgot their caution, and their retreat was not effected without considerable noise, which awoke us. Everything was recovered, except a quarter of the hare, which Ritenbenk contended was his lawful share of the game. His control as king-dog was admirable, for the rest of the half-starved pack watched him quietly as he ate the hare."

On May 10th the explorers crossed De Long Fiord, constructing, in passing, small cairns on the northern and southern points. They were able to travel only by the wind, which was directly at their backs, part of the time, as the coast was hidden by a violent snow storm. The coast from Cape Hoffmeyer north was a low, sloping shore, giving place in a short mile inland to a "grand line of cliffs."

After nine and a half hours' march in high, cold winds and drifting snow, during which they travelled twenty-two miles, the party camped on Mary Murray Island, $83^{\circ} 19' N$, $42^{\circ} 21' W$.

This island, shaped like a shoe, proved to be "a narrow, rocky ridge projecting a few hundred feet above the level of the ice, its top inaccessible except in a few places." From it three capes, the farthest probably Cape Washington, could be seen.

The violence of the gale delayed them at this camp sixty-three and a half hours. Latitude and time observations were obtained.

Animal life existed, as several snow-buntings flew around, hare tracks were noticed, and an unfortunate lemming was captured by the dogs. It was difficult to say whether the party were the most disturbed through mental anxiety and disappointment as to farther advance or by physical suffering from cold and exposure. The high wind, with the very low mean temperature of 8° (-13.3° C.), reduced their feet "to a condition," says Sergeant Brainard, "not unlike a cake of ice. We frequently changed our foot-gear, and rubbed our feet briskly with the warm hand, but to no purpose." This unprecedented experience was attributed to camping on bare ice, but it more probably resulted from insufficient food, as they ate only at intervals of fifteen, twenty-four, and nineteen hours, so as to enable them to travel yet farther.

Their twenty-fifth and last march is thus described by Lieutenant Lockwood:

"May 13th, 12.30 A.M.: Thermometer, 11° (-11.7° C.); barometer, 29.30. Northwest wind and snow, but the cape ahead could be seen, and anything is preferable to cold feet, which we have endured for sixty-two hours."

"Started at 1.45 A.M. after building a small cairn near-by. The north cape of Wild Fiord disappeared from view shortly after starting, but the travelling was very good near shore over 'blue top floe,' and at 3.45 A.M. the cape was reached. Here, and along the line of cliffs beyond which it terminates, immense masses of bergs and hummocks were pressed so closely to the foot of the cliffs that it was necessary to get outside on the floe. A tortuous way was found to the top of this ice-wall, and the sledge then lowered, by means of the traces, some fifteen feet or more. For some distance we worked our way slowly through a mass of rubble-ice, with the constant use of the axe, and crossed two or three small lanes of water; and beyond travelled for a

few hundred yards on a 'clear' floe of last year's ice, when, at 5.30-6.15 A.M., we were stopped by another lead or lane of water. The sun being discernible, I took an observation, and at the same time sent Frederik to find a crossing. (This crossing, says Sergeant Brainard, was dangerous, owing to thin and rotten ice.) One being found, we continued over a floe of last year's ice at quite a rapid gait on a line generally parallel to the cliffs. Presently the weather clearing, a large, wide inlet (Weyprecht Inlet), with the cliffs and mountains on its farther side, opened up to view, forming a grand panorama, the most remarkable yet observed. To the right oblique the line of cliffs ended in a cape, from which the coast turned abruptly to the south and then ran in a curve toward the southeast, forming the western shore of the inlet. Directly ahead was a pyramid-shaped island (Lockwood Island) of considerable altitude, which seemed to touch the line of cliffs back of it, which ran almost north and south, ending in a cape (Cape Kane) to the northeast of our position, and on the other hand gradually curving back to the southeast and forming the eastern side of the inlet. A little to the right of the island referred to is another (Brainard Island), *apparently* of a cone shape. The land to their rear towered up to an enormous height, and formed a mountain certainly not less than four thousand feet in height, completely dwarfing the islands and cliffs beneath. The tide-crack, which we were now on the outside of, ran in a great curve between the two capes, at the extremities of the inlet, and was marked by a wall of ice-hummocks. Inside was a level surface of snow, covering a floe which extended from shore to shore, and outside alternate masses of rubble and smooth floes of last year's ice."

Ten hours' work carried them only sixteen miles, and, worn out by travel through deep snow, they made their farthest camp at the north end of Lockwood Island, which, by circum-meridian and

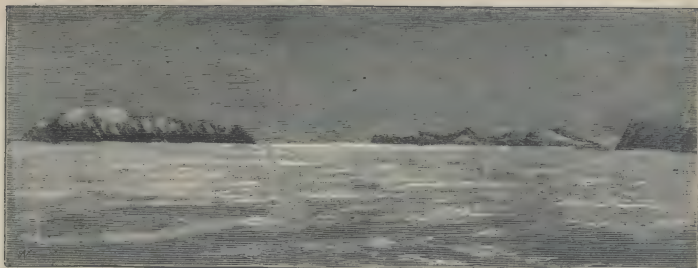
subpolar observations reduced by Gauss' method, was determined to be in $83^{\circ} 23.8' N.$, the highest latitude ever attained by man.

Of this event Sergeant Brainard's field notes say: "We have reached a higher latitude than ever before reached by mortal man, and on a land farther north than was supposed by many to exist. We unfurled the glorious Stars and Stripes to the exhilarating northern breezes with an exultation impossible to describe."

For three centuries England had held the honors of the farthest north. The latitude of Hudson, $80^{\circ} 23'$, in 1607, gave way to Phipps, who reached $80^{\circ} 48' N.$ in 1773. Scoresby, the elder, in 1806, reached $81^{\circ} 12' 42'' N.$; and, twenty-one years later, came Parry's memorable journey, during which he reached $82^{\circ} 45'$. These latitudes were all attained in the Greenland Sea. Inglefield opened to the world the Smith Sound route, and in 1871 Meyer reached $82^{\circ} 09'$, the highest on *land*, and Payer, a year later, almost equalled Meyer by his sledge-journey to Cape Fligely ($82^{\circ} 07'$), Franz Josef Land. In 1876 Aldrich surpassed Parry's famous latitude, and reached Cape Columbia, $83^{\circ} 07' N.$, only to be surpassed on *sea*, a few weeks later, by Markham, $83^{\circ} 20' 26'' N.$, during that journey over the Great Frozen Sea in which such energy, persistency, and courage were exhibited by the officers and men of the Royal Navy.

Now Lockwood, profiting by the labors and experiences of his "kin across the sea," surpassed their efforts of three centuries by land and ocean. And with Lockwood's name should be associated that of his inseparable sledge-companion, Brainard, without whose efficient aid and restless energy, as Lockwood said, the work could not have been accomplished.

So, with proper pride, they looked that day from their vantage-ground of the farthest north (Lockwood Island) to the desolate cape which, until surpassed in coming ages, may well bear the grand name of Washington.



Victoria Inlet from Cape Britannia, Nares Land to the left.

[From sketch by Lieutenant Lockwood.]

CHAPTER XX.

LOCKWOOD ISLAND AND RETURN.

OF his plans, at Lockwood Island, Lieutenant Lockwood says: "The rations being almost exhausted, I decided to make this cape my *farthest*, and to devote the little time we could stay to determining accurately my position, if the weather would allow, which seemed doubtful. . . . We built a large, conspicuous cairn, about six feet high and the same in width at the base, on the lower of two benches. It is about thirty feet above the level of the ice-foot, and about the same number of yards distant from it, and just this side of a picturesque mass of rocks which crowns the cliffs. In the cairn I afterward deposited a record of my journey to date, and also the thermometer (minimum registering). I regret that the instrument only reads to $-65^{\circ} - 53^{\circ}.9$ C., it was set at $+14^{\circ} - 10^{\circ}$ C. After repitching the tent Sergeant Brainard and I returned to the cairn, and collected in that vicinity specimens of the rocks and vegetation of the country, the sergeant making almost all the collection."

"We ascended without difficulty to a small *fringe* of rocks, which seemed from below to form the top, but found it only a

kind of terrace of the main elevation which lay before us. The ascent, at first very gradual, became steeper as we went up, but we had no difficulty, as for some distance below the summit the surface is covered with small stones, as uniform in size, position, etc., as those of a macadamized road. Reached the top at 3.45 p.m. and unfurled the American flag (Mrs. Greely's) to the breeze in latitude $83^{\circ} 24' N.$; longitude $40^{\circ} 46' W.$

"The summit is a small plateau, narrow, but extending back to the south to broken, snow-covered heights. It commanded a very extended view in every direction. The barometer, being out of order, was not brought along, so I did not get the altitude.

"To the northeast (about) projected a rocky headland (Cape Kane) to the north, and at its foot I could perceive another low shore projecting out and forming a cape some distance beyond, Cape Washington, doubtless separated from the first by a fiord (Hunt Fiord), as the first was from the promontory on which we stood.* The fiord just to the east of Conger Inlet extended south till shut out by the mountains south of us, but it presented every appearance of connecting in that direction with the fiord last crossed (Weyprecht). The horizon beyond, on the land side, was concealed by numberless snow-covered mountains, one profile overlapping another, and all so merged together, on account of their universal covering of snow, that it was impossible to detect the topography of the region. To the north lay an unbroken expanse of ice, interrupted only by the horizon. Could see no land anywhere between the two extreme capes, Washington and Alexander Ramsay, referred to, though I looked long and carefully, as did Sergeant Brainard. Delayed on top

* On map facing page 325, the sketch of Lieutenant Lockwood's entitled "Next Point beyond Farthest" shows Cape Washington to the left with Cape Kane in foreground: "Farthest from the West," discloses Lockwood and Brainard Islands against a high background, the west shore of Conger Inlet.

twenty minutes; left a short record in a small tin box under a few small stones (there were no large ones)."

Sergeant Brainard's field notes contain: "Several snow-buntings seen flying around the tent. The geological and botanical specimens were limited in number—the former owing to their weight, and the latter owing to scarcity of vegetation and trouble in securing it. Numerous traces of foxes, lemmings, hare, and ptarmigan at this point.

"The lately fallen snow has entirely disappeared, except oc-



Cape Alexander Ramsay.

[From sketch by Lieutenant Lockwood.]

casional drifts in ravines, leaving only the bare rocks and scanty stunted vegetation, which render the aspect a dreary and desolate one. The peculiar formation of the country, as well as the rocks, etc., presents certain characteristics, which give rise to the conjecture that in remote ages volcanic action was not unknown to these regions. To extend our rations sixteen hours between meals is at present our established rule.

"We now ascended the summit of the cape (Lockwood Island),

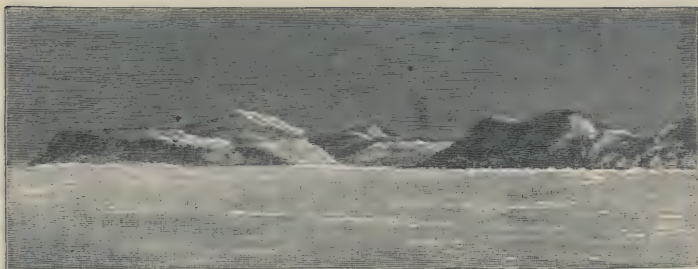
which was from two thousand six hundred to three thousand feet elevation above the sea, and displayed our flags. About eight miles to the northeast a point of land (Cape Kane) is visible, similar to the one on which we are now standing, with an intervening fiord (Conger) which probably communicates with the one to the westward, making this an island. Another point (Cape Washington), about fifteen miles away, projects farther to the north than the intermediate one. In the distance, looking past these points, is a low blue line stretching away to the northward. Owing to haze in that direction it could not with safety be pronounced land, although at first it gave one that impression. The interior was a confused mass of snow-capped peaks, and the country much broken by entering fiords. Toward the North the Polar Ocean, a vast expanse of snow and broken ice, lay before us. For sixty miles our vision extended uninterruptedly, and within it no signs of land appeared. The ice appeared to be rubble, the absence of the large palæocrystic floes being remarked on."

"As I awoke," says Lieutenant Lockwood, "a small piece of pemmican (our only remaining dog-food) was slowly but surely moving out of the tent. The phenomenon astonished me, and, rubbing my eyes, I looked more carefully, and saw Ritenbenk's head without his body, and found that his teeth, fixed in one corner of the sack, were the motive power. His eyes were fixed steadily on me, but head, eyes, and teeth vanished as I looked. He had burrowed a hole through the snow and had inserted his head just far enough into the tent to lay hold of a corner of the sack. The whole pack are ravenous, and eat anything and everything, which means substantially nothing in this case."

On the evening of May 16th, Lieutenant Lockwood and party left for Conger, and in nine marches reached Cape Bryant.

Apart from snow-blindness and bad travelling, the following are the most important incidents: Records were deposited at Mary Murray Island, Capes Hoffmeyer, Mohn, Neumayer, and Britannia. At the first cape snow-buntings and fox-tracks were numerous. Weyprecht and De Long Fiords were "of immense extent and have many lateral branches. The head of the last could not be seen; a long way up is an island."

At Low Point, $83^{\circ} 07' N.$, Lieutenant Lockwood stopped "to observe a glacier some distance inland to the eastward. This (Buys Ballot) glacier had all the appearance of a large mound-shaped hill covered with snow, with a continuous wall of green



Elison Island.

[From a sketch by Lieutenant Lockwood.]

ice all along the side toward the sea. The wall must have been of considerable height."

Sergeant Brainard says of it: "A glacier with smooth rounded surface, not unlike an inverted saucer in shape, and with a nearly vertical face two hundred feet high. We passed it in a snow-storm, going northward. Temperature low, but a cached thermometer and broken barometer have simplified our meteorological observations." At Cape Benet two ptarmigan flew by, and many tracks of foxes and hares were observed. Stopped opposite Elison Island and made a sketch of it. Nor-

denskjöld Inlet "runs a long distance inward, as straight as a canal—no land visible at its head."

Brainard says: "Lieutenant Lockwood intended going around Britannia to the eastward, but short provisions and deep snow in that direction prevented." The extra runner and small cooking-lamp were left at Cape Britannia for "next year." At that point old traces of musk-oxen were seen, and geological and botanical specimens obtained. Snow-shoes were put on on leaving that camp, and Lieutenant Lockwood says: "Regrets at leaving them behind haunted me every day while travelling north. Notwithstanding it was my first attempt, the relief was wonderful. We wore them almost continuously afterward, and had no difficulty in keeping ahead of the dogs to encourage them." Brainard also says: "Snow-shoes found to be very advantageous. Unfortunately we have only two pairs of them. Christiansen frequently breaks through the crust to his hips and is dragged out by upstanders and dogs. . . . Used surface ice (fifteen miles northeast of Cape May) for cooking purposes, it being entirely free from saline matter. Owing to scarcity of fuel we gnaw our frozen cakes of lime-juice when thirsty. Crossed tide-crack to-day: it is now frozen so thick it cannot be broken with a tent-pole. Saw a remarkable parheliion, five bright mock suns with prismatic colors, and a purple bar uniting four of them." North of St. George's Fiord many tracks of foxes going both north and south were met with.

Victoria Inlet, sketched from Britannia, was seen, in passing, to be a broad deep fiord, with no visible head, which presented a magnificent aspect, with the high cliffs of Nares Land to the east.

The last camp before reaching Cape Bryant, Brainard's notes say: "In their mad rush to secure their breakfast the dogs nearly upset the tent. Their wolfish propensities were aroused,

and neither blows nor Eskimo imprecations were of avail until food was thrown them."

At Cape Bryant Lieutenant Lockwood attempted to obtain tidal readings in a crack one-quarter of a mile from shore, in water from one hundred and three to one hundred and fourteen feet deep, but finally abandoned the attempt as fruitless. Sergeant Brainard's journal says: "Crustaceans were obtained from the bottom, adhering to the stone. The rock when drawn to the surface did not appear to have been in contact with gravel or mud. The strong movement of the line to the eastward would seem to indicate a current in that direction. Our dogs are evidently preparing for war. They tore open the ammunition-bag, bit several metallic shot-gun cartridges through and spoiled a dozen. I killed two snow-buntings for specimens."

At Cape Bryant Lieutenant Lockwood cached for "next year's work:" Pemmican, 98 lbs.; bacon, 7 lbs.; hard bread, 47 lbs.; alcohol, $18\frac{1}{2}$ lbs.; dried beans, $18\frac{1}{2}$ lbs.; chocolate, 4 lbs.; tea, $1\frac{3}{4}$ lbs.; stearine, about 15 lbs.; snow-knife, medicines, and fifteen shot-gun cartridges.

The distance from Cape Bryant to Polaris Boat Camp was passed over in six marches. Sergeant Brainard discovered Lieutenant Beaumont's cache at Bryant. The pemmican, spirits of wine, and tent were missing, probably covered with snow; but an Enfield rifle, cartridges, and a few articles of underwear and sledging-gear were found. Near it Lieutenant Lockwood shot a ptarmigan "on a floeberg, quite remarkable for its size and the regularity of its shape. It was thirty feet high by fifty long and broad, square in form, with undulating surface to its snow-covered top. *Salt* icicles hung from its south side. The ice composing it was very homogeneous. How such a mass could be pushed up until it touched the ice-foot is a mystery." Near Cape Stanton he says: "The ice to the north

seemed very rough ; no extensive floes visible. . . . The changed appearance of the floebergs is a subject of daily remark. Well-known floebergs were so much dwindled down in size as to be hardly recognizable."

At Repulse Harbor they opened Lieutenant Beaumont's cairn. Sergeant Brainard well says : " Poor fellows ! their history at this period, when the whole party, scurvy-stricken, were turned back by open water from their attempt to reach the Alert, is related in this record by Lieutenant Beaumont in a touching and pathetic manner."

In 1876, Lieutenant Beaumont, after a journey of successful exploration, pushed with extraordinary energy until the breakdown of his sledge-crew by scurvy on the eastern shore of Sherard Osborn Fiord, found himself compelled to turn backward with his disabled crew. After a severe and exhausting march along the North Greenland coast, during which his men sickened and weakened daily, he reached Repulse Harbor with his party in an almost helpless condition.

With a laudable desire that his work should live after him, Lieutenant Beaumont left at Repulse Harbor a record of his successful geographical explorations, and further says : " Out of seven men forming the whole party, two, William Jenkins and Charles Paul, are absolutely helpless, having to be dressed and carried to and from the sledge. Another, Peter Craig, is just able to walk very slowly. Wilson Dobing is gradually approaching the stage when he will no longer be able to pull, and Frank Jones, though he has unmistakable signs of the same disease, has not become worse until the last few days. Severe work made the stiffness a little more felt ; the two last, together with Alexander Gray and Lieutenant Beaumont (who, as yet, is well in health), are the four working hands upon whom the burden of the work falls entirely. Both Dobing and Jones are

working with great spirit and determination ; Craig has shown much courage in holding out so long, and all have done their best."

Uncertain as to the best course to follow in his desperate strait, Lieutenant Beaumont boldly decided to cross Robeson Channel to the Alert, where relief was certain, but, in doubt as to the possibility of making the trip, he wrote :

"I, Lewis A. Beaumont, who wrote the preceding record, having weighed over very carefully the whole matter, firmly believe that, to the best of my belief and knowledge, I have taken the right course and hopefully trust, with God's help, to carry it out.

"It is my intention, immediately on reaching the Alert, to procure assistance for those at Polaris Bay (believing that they are too few to manage the twenty-foot ice-boat), either from that ship or the Discovery."

Rotten ice and open pools drove him back, but he did not despair and turned his face southward, adding :

"We have been out on the ice, and, after having successfully passed the shore hummocks and the first floe, we came to open water and last year's ice decaying fast. Though we could have got round it, I did not feel justified in running so great a risk as it would be to arrive on the other side eight days later with three helpless men and more open water ; so, having no choice left, we are starting for Polaris Bay immediately."

Still later, when affairs were yet worse, he wrote :

"REPULSE HARBOR DEPOT, June 13, 1876.

"Three of us have returned from the camp, half mile south, to fetch the remainder of the provisions. Dobing has failed altogether this morning.

"Jones is much worse, and cannot last more than two or three days.

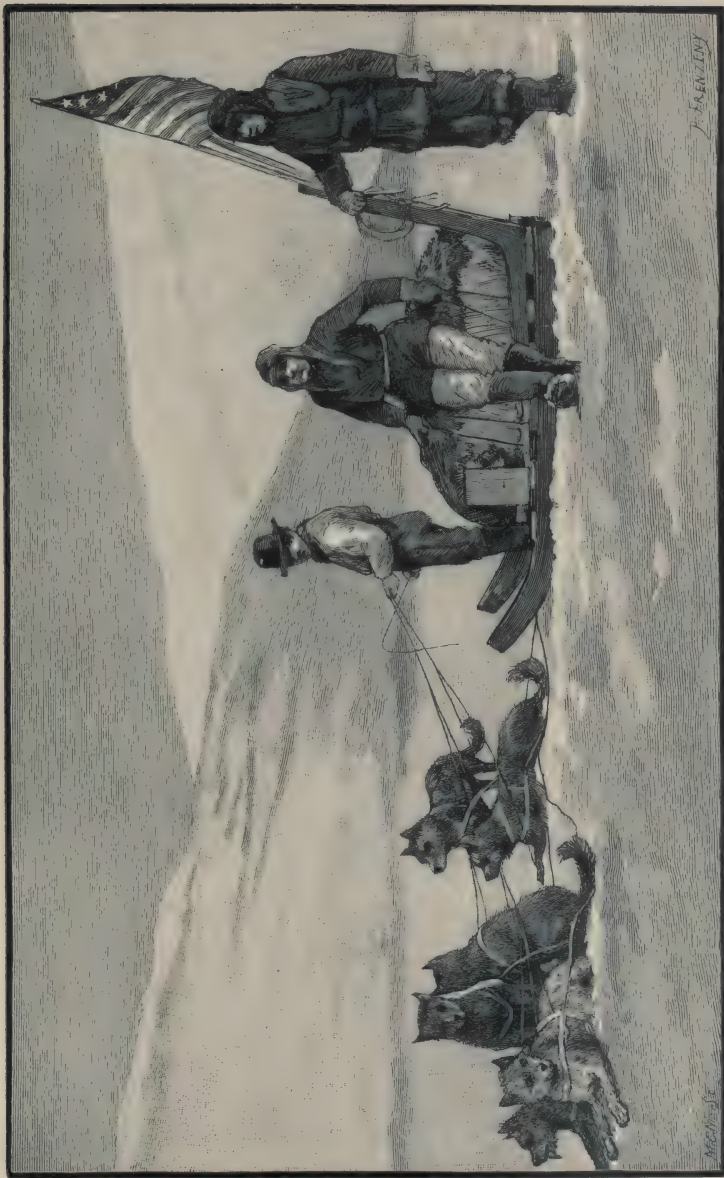
"Craig is nearly helpless ; therefore we cannot hope to reach Polaris Bay without assistance. Two men cannot do it, so we will go as far as we can and live as long as we can. God help us.

"L. A. BEAUMONT."

This brilliant record of British courage, discipline, devotion to duty, and endurance must ever affect deeply all who may read its full details. To the men of the Lady Franklin Bay Expedition, who justly appreciated the terrible contingencies of the situation, and who dared similar dangers, this story, as told by the gallant Beaumont, was full of deep and thrilling interest.

The trip from Repulse Harbor through Gap Valley was made in a little over eleven hours. A wonderful snow-grotto was found in Gap Valley, being, says Brainard, "about a hundred yards long with an entrance ten feet in diameter. It was supported by small columns, and the vaulted roof was covered with fine, feathery frost-work, more beautiful than any which had ever before charmed my eyes." Near here he "found several rocks containing fossils."

Sergeants Lynn, Ralston, and Elison were found well at Polaris Boat Camp. They had reached that place in six marches from Cape Bryant, travelling as rapidly with their light sledge as Lieutenant Lockwood had done. Frederik, Jewell, and Salor had returned to Fort Conger. The party at Boat Camp had experienced a succession of violent gales which made life wretched and uncomfortable. The only exciting event had been the visit of two bears, May 17th, which came from Newman Bay and passed southward from Cape Sumner while the party were asleep. A few ptarmigan and a fox were the only other signs of animal life during the twenty-five days' monotonous stay.



LIEUT. LOCKWOOD, BRAINARD, AND CHRISTIANSEN RETURNING FROM 83° 24' N.

(From a photograph.)

Lieutenant Lockwood left there four hundred pounds of rations and some other supplies for the next year's work, and in fourteen hours' travel crossed Robeson Channel to Cape Beechy in face of a violent snow-storm. It was quite remarkable that, travelling on this day in which no sun was seen, the party were badly affected with snow-blindness through not using goggles. Two of them had to be led into Conger, where the entire party arrived June 1st, after an absence of sixty days. Apart from snow-blindness they were all strong, healthy, and sound.

This sledge-trip must stand as one of the greatest in Arctic history, considering not only the high latitude and the low mean temperature in which it was made, but also the length of the journey and the results flowing therefrom. The mean temperature for the forty-three days' outward travel was below zero Fahrenheit—one of the lowest means on record for an extended trip. The party were absent sixty days, and experienced no serious frost-bites, although subjected frequently to temperatures from -31° (-35° C.) to -49° (-45° C.). During that time Lieutenant Lockwood made with the dog-sledge forty-six marches, and travelled (one thousand and seventy statute miles) nine hundred and twenty-eight geographical miles—an average of over twenty geographical miles to a march. His outward journey of two hundred and seventy-six miles entailed travel of four hundred and seventy miles, owing to the necessity of doubling up and assisting the man-sledges. The outward rate of travel was 2.1 miles, and inward 2.3 miles per hour.

His discoveries extended to a point ninety-five miles along the north Greenland coast beyond the farthest ever seen by his predecessors, to which should be added about thirty miles of coast-line between Capes May and Britannia not visible to Lieutenant Beaumont. The results of his journey, then, consist

not in the mere honor of displaying the Stars and Stripes four miles nearer the geographical Pole than the flag of any other nation, but in adding one hundred and twenty-five miles of coast (not including several hundred miles of inland fiords) to Greenland, and in extending the main-land, over a degree of latitude, from Cape May northward to Cape Washington.

The domain added to Physical Geography may thus be summarily described: From Cape Bryant to Cape Washington the coast-line is a series of high, rocky, and precipitous promontories, probably the north projection of islands in many cases, with intervening inlets. This afforded but little coast-journeying, and necessitated the constant crossing of fiords with accompanying bad travel.

The inlets, with "no visible land at the head of several of them, were very much like immense canals, and gave the whole coast the appearance of Greenland between Upernavik and Disco." One inlet from the summit of Britannia Island appeared to run nearly parallel to the coast, making "islands of all the promontories to the north." As far as seen "the interior seemed very high and was . . . a maze of mountain-peaks, with universal covering of snow, merging into and overlapping one another. . . . From Lockwood Island I saw mountains to the east, perhaps twenty or thirty miles distant, and a high mountainous country doubtless exists all along this coast for some distance to the south, the shore-lines of the fiords invariably being at the base of steep cliffs and mountains."

The tide-crack, as it was called, is a very remarkable division between the somewhat hummocky floes of the Polar Ocean and the level ice of the inlets, varying from a few feet to several hundred yards in width. It was seen from near Cape May to Lockwood Island—and later off Cape Bryant—and stretched from headland to headland in gentle curves. Near

Cape Frederick moving ice was detected. I agree with Lieutenant Lockwood that it was caused by "the outside polar pack having constantly more or less motion." This cause seems most probable, as the drift of the *Tegetthoff*, *Dijmphna*, and *Jeannette* in different parts of the Polar Basin, and Norden-skjöld's experiences at Mossell Bay show beyond a doubt that open water-spaces exist in the Polar Ocean, and its main ice moves the entire winter. The drift of Dr. Pavy near Cape Joseph Henry, and of Brainard at Black Horn Cliffs, both in April and in different years, prove the uncertain unification of the polar pack, even in early spring when floe-ice is most solid.

The existence of last-year's ice to the northward of Cape Britannia indicates that in unusually favorable years there is a possibility of a well-found ship pushing along the northwestern coast of Greenland, as Maclure did along Banks Land; probably, too, to meet the same fate as the *Investigator* in Mercy Bay.

The age of the tide at Conger and the exceptional depth of the sea north of Cape May (one hundred and thirty-seven fathoms and no bottom) augur to my mind the inconsiderable extension of Greenland to the northward (say to the eighty-fifth parallel) and the presence there of a deep sea as compared with the shallow basin north of Grinnell Land. Indeed, I doubt not there is a very considerable land to the north of the Parry Islands, which, entirely ice-clad, throws off to the east the immense palæocrystic floes and floebergs which crowd down on Grinnell Land and thence southwestward to Banks Land. In a limited way the same conditions prevail near the North as toward the South Pole. This opinion indicates my belief that Carpenter has advanced the correct theory as to the formation of this ice, and that Moss was right in believing the salt in it to be by infiltration and efflorescence.

Lieutenant Lockwood's success might have been greater if

the dogs, purchased in Greenland, had been exempt from disease. Other causes militated against him, for which I was responsible. Had I not been tempted to send a party north of Cape Joseph Henry, when the mere honor of the Farthest North seemed within our grasp, the North Greenland expedition would have been pushed at least fifty miles beyond Cape Washington. Had Lieutenant Lockwood carried snow-shoes beyond Britannia, he would undoubtedly have reached Cape Washington. If I had sent northward Hudson Bay sledges, steel shod, a few miles at least would have been added to this unprecedented latitude. With our wits sharpened by our first year's experience, and with our energies turned in one direction Lieutenant Lockwood and I concurred in thinking that he could proceed a hundred miles beyond Lockwood Island. His extraordinary journey to Black Horn Cliffs, when he was turned back by open water, in 1883, proves that this opinion had sound premises. In 1882 Lieutenant Lockwood's opinions were in entire accord with my own, and our mistakes, which only add to his credit for this successful work, are touched on only for the benefit of posterity and our successors in Polar exploration.

This journey has been erroneously thought by some to have opened up again the Smith Sound Route. Such is not the case, for no nation will willingly spend \$500,000 for a *possible* chance of planting their national ensign a hundred miles north-eastward of Cape Washington. I say possible chance, for on the coincidence of favorable ice-navigation, solidity of the pack, perfect outfitting of a sledge-party, good judgment, and indomitable energy of leader and men depends the hope of success of any party who strive to beat, on the Greenland coast, the latitude of Lockwood and Brainard.

CHAPTER XXI.

SPRINGTIME AND SUMMER.

OUR winter had been one of unprecedented severity—the mean temperature for the one hundred and thirty-one days without the sun being -32.3° (-35.7° C.). Spring opened, however, much warmer, and its March mean of -29.9° (-34.4° C.) was particularly mild.

Apart from the sledge journeys, the following items extracted from my journal cover the most important incidents of our spring life in 1882:

“March 2d.—Sergeant Rice and party went to Watercourse Bay for the two musk cattle cached last autumn. They found only the bones hanging to the tripod, the meat having been picked by cunning foxes through the snow-drifts forming by it.

“I have been running for exercise lately, and, from two hundred and fifty yards the first day, now run three thousand yards without stopping. Shortness of breath and stiffness were at first experienced, but have now passed away. This experience varies from the facts noted by Nares, where violent exercise, even with healthy men, was followed by blood-spitting.”

“7th.—Lieutenant Kislingbury, hunting to-day, wounded a hare through the hind leg. It hopped steadily away, and was followed two miles before he got a shot, when a ball was put through the stomach. In two miles' further chase it lost a cupful of entrails. A third ball broke both fore-paws, when the animal, jumping to reach a high rock, fell over a cliff for nearly

two hundred feet. When picked up it still showed signs of life. Such tenacity of life on the part of so timid and weak an animal was surprising."

"March 8th.—I learned to-day that one of the officers had lately neglected to take his lime-juice regularly. On questioning him he said he thought its beneficial effect as to scurvy would be destroyed if it was persistently taken. I felt obliged to insist on the same rule in this matter for officers as men,—no exemption except for medical causes."

"10th.—The black bulb, in the sun, recorded to-day, for the first time, 11.8° (-11.2° C.)."

"23d.—Our first lemming was caught to-day. The ends of its black hairs were pure white, giving it a peculiar pepper-and-salt appearance."

"25th.—To-day, with its mean temperature of -40.5° (-40.3° C.), is the coldest of the month. The minimum was -46.8° (-43.8° C.)."

"26th.—Private Bender was re-enlisted to-day, his term of service having expired yesterday."

"29th.—The barometer touched 28.988, the lowest point reached since our arrival. The day is, however, clear and calm."

"April 3d.—Sergeant Rice saw icicles pendent upon a floe and from the cliffs with southern exposure. The highest temperature has been -7° (-21.7° C.) He brought in a fox, probably poisoned."

"8th.—The sun is now above the horizon at midnight. To-day the temperature rose at 5 P.M. to 1.2° (-17.1° C.) after having been below zero (-17.8° C.) for one hundred and sixty consecutive days. Private Henry saw a wolf at Depot "B," April 6th, and two followed Connell and him to Distant Cape yesterday."

"April 11th.—The snow on the black roof melted freely under the influence of the sun. Lieutenant Kislingbury saw an eagle, and its scream was heard by Sergeant Gardiner." This was probably the same eagle which was seen by Lieutenant Lockwood and Eskimo Frederik in St. Patrick Bay, April 4th.

"13th.—Long killed a ptarmigan near the coal-mine."

"14th.—Gardiner heard a snow-bird, the first of the season."

"16th.—Cross, hunting to-day, saw a fox."

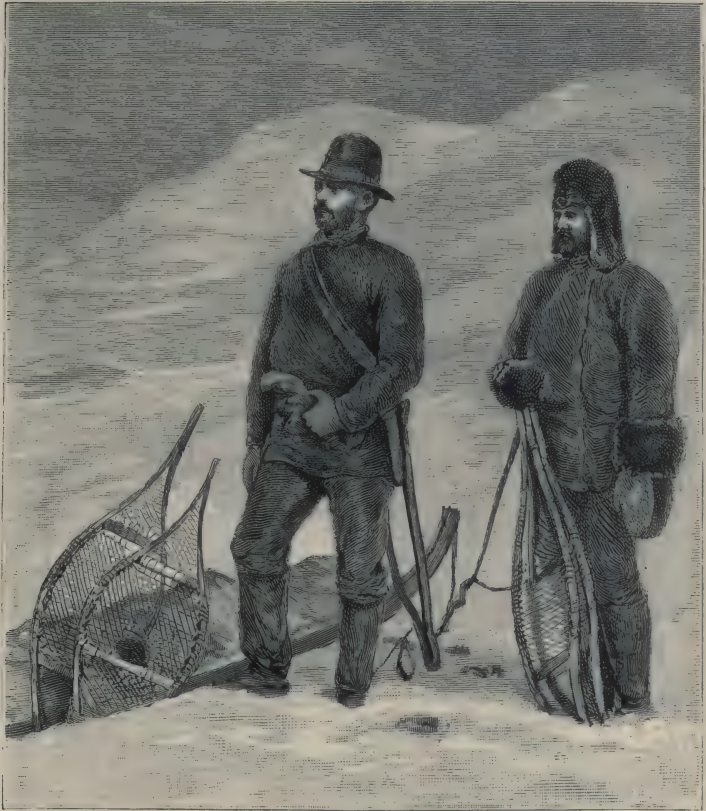
"22d.—The maximum at The Bellows since October 12th has been 15° (-9.4° C.), against 13.9° (-10.1° C.) at Conger."

"29th.—Two snowy owls were seen to-day by Lieutenant Kislingbury."

"May 3d.—An incident, which caused much amusement, occurred while I was in the field, in which Lieutenant Kislingbury played a part. One of the men had suffered terribly for nearly a week with toothache, which permitted him neither to eat nor sleep. Lieutenant Kislingbury was the only officer at the station, and the man begged him to pull his tooth, which the Lieutenant consented to do, with the understanding that the afflicted man should himself adjust the forceps. This done, Lieutenant K., by main strength pulled the tooth, fortunately without breaking the man's jaw. To their consternation, however, the tooth pulled was perfectly sound, while the aching one still remained. The men have suffered considerably from toothache during the past year." It is especially important that all recruits for Arctic service should have perfect teeth.

"5th.—Schneider, with his team of seven puppies only five months old, made their first long trip at this time. They made a round trip of over fifty miles in twenty hours, hauling from forty to sixty pounds per dog. They are now considered fit for light field work." These dogs, raised with so much care and trouble, proved of great value in subsequent explorations.

On May 14th, in accordance with Long's request, I sent him and Whisler to visit the English depôt in Archer Fiord. Long had been debarred from extended trips, owing to the uncertain



Long and Whisler returning from Archer Fiord, May, 1882.

[From a photograph.]

state of his health, and by the advice of the doctor. They took a Hudson Bay sledge and snow-shoes, and were absent but four days and two hours, during which time they travelled about sixty-five miles. Long travelled some distance farther

than Whisler and visited Hillock Depôt where the rations left by Lieutenant Archer, R.N., were found in good order, except the bread which was mouldy.

On May 9th Dr. Pavy was ordered to proceed with dog-team the following day to Repulse Harbor, to communicate with Lieutenant Lockwood's party, but Jewell, Salor, and Frederick returned to the station that day bringing a report of Lieutenant Lockwood's movements. The order was consequently amended and Dr. Pavy visited instead Sergeant Lynn's party at Polaris Boat Camp, taking them some delicacies from the station. He returned on the 16th, coming in accordance with his orders by way of Thank God Harbor, from which he brought three cans of pemmican, a grindstone, and several books.

May 16th, seal-holes were observed near Distant Cape, and two days later a seal (*Phoca barbata*) was seen. Five of this species were subsequently killed during the month—four by Jens and one by Connell. The largest was eight feet two inches long and weighed four hundred pounds gross. One of the seals had evidently been injured by a bear, as he was badly scratched and one of his flippers had been bitten off. The seals were flayed by Jens and the skins kept for specimens, but the meat, except the liver and other choice bits, was fed to the dogs.

Seal-hunting was a matter of pride and interest to Jens, and he pursued it as long as the condition of the ice would permit. He used a blind, a large piece of white cloth, which was mounted on a miniature sled so as to cover it entirely from view. The hunter crawling cautiously on the ice, pushes the sled before him, watching the seal through a small hole in the cloth. A support on the sled affords a rest for his rifle when the hunter is sufficiently near to be certain of killing the seal.

“ May 15th.—I saw to-day a patch of moss quite green ; temperature 16° (−8.9° C.) ”

“ May 19th.—I visited the coal-mine to-day, going overland. In the deep, soft snow were many tracks of foxes and lemmings. In certain places a fox had been digging for lemmings, there being frequently holes a foot deep. In one case the fox had dug down vertically eighteen inches, and then tunnelled after the lemming for a long distance. I obtained from the slate above the coal about fifty fine specimens of fossils. The work was too dangerous to be long pursued, as huge masses on the overhanging cliffs had been detached by this melting weather, and were ready to separate and fall. Several fell while I was present. The coal seam is two hundred yards long and extends eight feet above the level and an unknown distance below the surface of the creek which flows by it in summer. It seems probable that the stream has worn its way through the friable slate and soft coal, leaving the present narrow deep cañon with walls of slate and coal. Near by the main seam is another of less extent. An immense quantity of coal could be easily mined. I saw what I took to be an Iceland gull (*Larus leucopterus*). I at first thought it the Burgomaster, but it was so small and the pale blue mantle was so marked that I consider its identity certain. I saw a trickling stream to-day, from which possibly two gallons an hour were flowing. Several such have been seen within the past few days in very favorable localities. Up to this time the maximum temperature has been only 23.8° (-4.6° C). Connell caught a lemming to-day.

“ May 21st.—An Iceland gull, evidently a straggler, was seen to-day; probably the same bird observed by me on the 19th.

“ May 25th.—Lieutenant Kislingbury brought in an owl's egg, which was somewhat larger than, though closely resembling, the white egg of a hen. Sergeant Israel found it very palatable. The male bird showed signs of fight when the egg was taken, while the female looked on from about a hundred

yards. The first owl observed was on April 29th ; since then one or more have been frequently seen. The nest is a mere hole hollowed out on the summit of a commanding knoll, and furnished with a few scattered feathers, grass, etc.

“Long planted half of the garden to-day.” Lettuce, cabbage,



Coal Seam showing above Watercourse Creek.

[From a Photograph.]

radishes, etc., were experimented with unsuccessfully, owing, I think, to the alkalies in the soil.

On May 25th I sent Sergeant Israel, Connell and Jens with a dog-team to ascertain whether Lake Hazen was practicable by an overland route through The Bellows.

The following is a summary of Sergeant Israel's report :

Seven hours' march brought them to the depôt at head of Basil Norris Bay. Traces of game were seen, and several musk-oxen travelling westward on Sun Peninsula.

Camp No. 2 was made after five and a half hours' work, about a mile and a half southeast of Devil's Head, in a latitude which was later determined to be $81^{\circ} 46' N$. The valley at first was almost entirely bare of snow, but later they were obliged to put on snow-shoes. "At this camp," says Israel, "we found a considerable quantity of coal, some wood, and numerous pieces of a substance resembling resin. The valley had recently been crossed by a herd of musk-oxen. . . . Connell found a musk-ox skull, apparently of great age."

Camp No. 3 was made just north of a projecting spur from the west, which nearly crossed the valley. Longitude, by observation, $6^{\circ} 10.4'' W$. of Conger (in time); latitude, $81^{\circ} 47' N$.; magnetic declination, $102^{\circ} 10' W$. From an adjacent hill fourteen musk-oxen were seen, of which "Connell shot two cows and a yearling. After driving off the rest of the herd we skinned these." Two hours' travel on May 28th brought them to a place where the valley narrowed rapidly, with steep mountains to the west. Connell was sent up a mountain, but saw only an occasional peak to the west, owing to cloudy weather. He ascended fourteen hundred feet above the valley, which was at that point about three hundred and twenty feet above the sea. Israel "proceeded up the valley about three miles. The valley at this point splits into two narrow ravines, one extending up a mountain-side for a mile, and the other terminating in the same manner after extending to the north about three miles. As there is no turn in either of these passes there can be no doubt that the valley ends here instead of communicating with another running in from the east as I at first thought."

Returning to the point where Connell had ascended the mountain the latitude (by observation) was determined to be $81^{\circ} 54'$ N., longitude (D. R.) $7^{\circ} 44.4'$ W. of Conger (in time). About three miles north of Devil's Head the valley was measured with the following results: "Width, 4,280 feet; height of cliffs, west, 1,999 feet; east, 825 feet." In returning, lack of snow forced them to carry load and sledge for considerable distances. The upper portion of the ravines, which were said by Sergeant Israel to be filled with snow, must have been filled with glaciers, for the amount of water seen later in Bellows River was by far too great to have come from any snow in the valley. The musk-oxen killed by Connell were later brought to the station by Sergeant Rice, who was sent with Schneider and Jens into The Bellows.

"May 28th.—The temperature at 9 A.M. reached 32.5° (0.3° C.) having been continuously below the freezing-point for nine months less two days."



Decoration Day at Conger, 1882.

[From a Photograph.]

“May 30th.—It being Decoration Day, we observed it as a general holiday. Happily we have no graves of our own but on this occasion, Frederick and Long were inspired with the thoughtful idea of decorating the head-boards of the dead of the British Arctic Expedition, set up at this place in 1876. In default of regular flowers they made an elaborate artificial bouquet, which, with our camp colors, were tastefully draped over the head-boards.” These marks of appreciation and honor to our dead predecessors must be considered of greater value thus coming from the rank and file of the expedition than if the initiative had been taken by the officers.

June was opened by the safe return of Lieutenant Lockwood and his party, who were not long contented to remain at the station. On June 10th Lockwood, Brainard, and Frederik left under orders for a trip down Archer Fiord and returned on the 15th. In addition to six hundred and fifty pounds of dressed meat from three musk-oxen killed by them, they brought in the English Hillock Depôt of eighty-four rations, the bread being bad. It was evident that the rations left in bags by Lieutenant Archer, R.N., had been consumed by animals. Lieutenant Lockwood was turned back from Hillock Depot by the immense quantity of water covering the floe in Archer Fiord.

Of Eskimo relics Sergeant Brainard says: “I found at the head of Sun Bay the sites of fifteen Eskimo summer tents, evidently occupied during their hunting season. Near the head of Basil Norris Bay I discovered fifteen other circles slightly larger than the first. I picked up numerous bone and a few wood relics of these hardy people, but nothing metallic was seen. Those I collected were worked, drilled, and bored, but large numbers of split bones, probably of the seal and musk-ox, were strewn around.”

My journal says of these relics: “The most important is of

worked porous bone, six and one-half inches wide, one and one-half inch thick, and eighteen and one-half inches long. Evidently it is a part of a native sledge and of the cellular bone of the whale, as described by Kane. One side was covered with lichens (of which I recognized at once seven separate kinds), and was so affected by exposure as to be almost unrecognizable as bone. The reverse side, however, showed plainly the marks of the knife. No less than forty-two circular holes had been bored through or into (so as to connect with other holes) this piece. On both sides appeared mortices into which dowels, extending from this piece to others, could be inserted. In addition, one end was thinned down so that it would overlap a second similar piece without increasing the thickness. Two bones forming a peculiar harpoon were found, which are so fastened together that when used the head remains in the seal, while the shoulder, as it may be called, is by a pull separated from it, forming with the seal-thong (by which it remains connected with the head) a hinge by which the animal can be towed without pulling out the lance. It is like the harpoon of the Danish Eskimo. There are several other parts of hunting-gear. A dog-trace fastening (whale's tooth probably) appears much fresher and is in far better condition than any other article discovered. One very small article is of walrus ivory. Sergeant Brainard says that fully a ton of bones could be gathered from one of the encampments. There was only one place resembling a house, about six feet square, of large flat stones, the roof of which had fallen in."

Various other signs of the presence of Eskimo encampments were noted in the vicinity of Discovery Harbor. On June 5th Connell found the bone handle of a skinning-knife at the site of what was thought to be a lookout on a high cliff above Dutch Island. I later visited the place, and a careful search resulted in the discovery of a toggle for dog-traces made of walrus

ivory, a spear-point of narwhal's horn about nine inches long, many bones of hare and lemming, and one which might have been human, though the doctor could not state positively, as it seemed too porous. In addition, a piece of pine (?) wood carefully worked, two inches long, an inch wide, and an eighth of an inch in thickness. In one end and one side were two small wooden pins, which had evidently been used in fastening other pieces to it. On June 15th, I found on a low plateau near Fort Conger, south of Cascade Ravine an ancient Eskimo cache. June 20th, Connell dug up, near Proteus Point, part of a stone lamp and various articles of hunting-gear made from walrus ivory. One of the most interesting articles we discovered was a piece of birch bark admirably preserved.

June 21st, I discovered an Eskimo cache on the plateau near the Sugar Loaf, and two days later Private Henry found at Distant Cape, about two hundred feet above the sea, part of a bone shoe of a sledge-runner on which were six or seven different kinds of lichen. July 2d, Sergeant Brainard found, near Dutch Island, the site of an Eskimo summer encampment, where he unearthed several parts of hunting implements made of the bone of the whale, and a spear-point of a narwhal's horn. A few days later he picked up the bone handle of a knife, another spear-point, and the shoe of a sledge-runner.

Though no permanent huts were to be found near Conger, yet the many traces indicate that for years the Eskimo must have frequented the shores of Discovery Bay, and later discoveries proved their winter residence in the interior.

On June 10th Connell killed two musk-oxen near the station, and this led to the discovery of seven others, who, strange to say, were gathered on the very summit of Sugar Loaf, about eighteen hundred feet above the sea. A party sent out killed them all and captured alive four young calves, which were

found with them. The calves were brought in by the men on their heads from the top of the mountain, at which point Dr. Pavy picked up a fossil shell. Every effort was made to raise the calves, which soon became tame and tractable. They ate milk, corn-meal, and almost any food that was given them. They grew finely, except one whose throat was torn open by the dogs. In a short time they became very fond of Long and Frederick, who generally cared for them, and would follow them around and put their noses into the men's pockets for food. I



Musk Calves at Conger, Four Months Old.

[From a Photograph.]

had intended to send them to the United States by the visiting vessel of 1882. When the long nights came it was impracticable to give them exercise, and probably from this cause, despite our care, they died.

On June 19th I succeeded in having the launch moved from her winter bed on the ice-foot into the tidal crack.

One of the most surprising peculiarities of Grinnell Land was the unusually early date on which flowers came into blossom.

June 1st the purple saxifrage (*Saxifraga oppositifolia*) was in bloom, and three days later the catkins of the willow (*Salix*

arctica), followed the next day by the sorrel (*Oxyria reniformis*). On the eleventh *Cochlearia fenestrata* blossomed, and ten days later the Arctic poppy (*Papaver nudicaule*). On the latter date I discovered on the summit of the Sugar Loaf reindeer moss (*Cladonia rangiferina*), one of the few places in which it was found growing near Fort Conger. That 1882 was not an exceptionally early year was shown by 1883, when, giving personal attention to the subject I discovered six varieties in bloom by June 6th. At Thank God Harbor, in 1872, saxifrage was in bloom by June 3d.

Of the birds of Grinnell Land, the rock ptarmigan (*Lagopus rupestris*) is a winter denizen. The owl (*Nyctea scandiaca*) and snow bunting (*Plectrophanes nivalis*) had been with us since April, while a stray eagle (*Haliaeetus albicilla*) and Iceland gull (*Larus leucopterus*) had also been observed.

On June 3d the ravines commenced discharging generally into the bay, and on the same day the geese (*Bernicla brenta*) arrived, accompanied by one of the robber gulls, the long-tailed skua (*Stercorarius longicaudatus*). In the order named appeared later the burgomaster (*Larus glaucus*), dovekie (*Uria grylle*), knot (*Tringa canutus*), king duck (*Somateria spectabilis*), long-tailed duck (*Harelda glacialis*), eider duck (*Somateria mollissima*), tern (*Sterna macrura*), and turnstone (*Streptilas interpres*).

It was remarkable how wild and wary were the members of the feathered tribe which came to us in summer. Only by great caution and patience could our hunters get within gunshot, and then many specimens were lost by falling in the sea where strong currents and heavy ice prevented their recovery.

CHAPTER XXII.

SUMMER EXPLORATIONS.

[LIEUTENANT GREELY'S JOURNEY.]

LATE in June sledging over the sea-floe was ended, and nothing but summer routine was possible in the vicinity of the station.

I decided to personally renew the explorations of the interior of Grinnell Land. With this view Private Biederbick was sent to the depot at Basil Norris Bay, with orders to penetrate as far into Black Rock Vale as it was possible for him to do, and return in a single march. He travelled some sixteen miles up the valley discovering a lake of considerable size, temporarily named Lake Heintzelman, which discharges into the sea through a river of the valley. He reported travel to be practicable for some distance by wagon, the manner in which I contemplated pursuing this work.

Later Sergeant Lynn with Private Bender were sent into the valley with orders to ascertain whether the northern end of Lake Hazen could be reached by that route. They took with them from the Basil Norris Depot a dog-tent, and light sleeping-bag, to be left a day's march outward. They were absent four days and succeeded in reaching a high hill from which four glaciers could be seen, and a lake which they believed to be Lake Hazen. They were doubtful whether a wagon could be hauled over the country successfully.

I decided, however, to make the attempt, and left Fort Conger on June 24th with Lynn, Biederbick, Salor, and Whisler. I travelled as far as the depot in Basil Norris Bay with the dog-sledge Antoinette. The harbor floe had lately been covered with much water, which left the surface of the ice sharp and pointed. The dogs' feet were badly cut owing to the forgetfulness of the driver to take sealskin boots for them. These boots are very necessary in travelling over sharp ice at any season or hard snow at very low temperatures. Considerable difficulty was experienced in reaching safely the southwestern shore of Discovery Bay, owing to the many water-holes in the main floe.

While the party were cooking dinner I obtained latitude observations, and later examined the sites of the Eskimo summer encampments, which were on a plateau about twenty feet above tide-water. There were large piles of bones mostly of the seal, which had been split evidently for the marrow. A few pieces of worked bone and wood were found, and also the slat of an ancient Eskimo sledge.

Our travelling outfit, taken from the depot, was of limited character and quantity; consisting of bread, pemmican, corned beef, tea, chocolate, sugar, milk, salt, pepper, and alcohol, and sleeping-bags. The plan of march contemplated two men hauling the fore-wheels of a light wagon, on which the main load was packed. Two others carried knapsacks containing loads of about twenty pounds, and at intervals these men changed work with those pulling the wagon.

I carried myself the scientific instruments, including telescope, prismatic compass, sextant, etc., and employed my time in examining, as fully as possible, the country over which we passed. At one low ridge, before Black Rock Valley was reached, I found by digging that the alluvial soil was composed of various strata of a fine lignite coal and of sand. The coal evidently

had been brought to that point and deposited by the floods from the river in The Bellows.

Nearly three hours' work brought us to the "Knife Edge," a remarkable formation on the western side of Black Rock Vale. On the east side is a high round bluff of peculiar formation known as Bifurcation Cape, which separates The Bellows and Black Rock Vale. The river was nearly forty yards wide and



Bifurcation Cape, separating Bellows and Black Rock Valleys.

[From a Photograph.]

eighteen inches deep at the entrance of the latter valley. From the very entrance of Black Rock Vale we had virgin ground for exploration, untrodden by our English predecessors.

After thirteen hours' travelling from our home station we camped on the northeastern side of Lake Heintzelman, at the point where the dog-tent had been left by Sergeant Lynn.

On the shores of this lake Biederbick found a pair of rein-

deer antlers, and I picked up a piece of close-grained wood, apparently pine, two and a half feet long and nearly an inch in diameter. A musk-ox was seen near this point, but at too great a distance to be pursued. Indeed, hunting was quite apart from the object of the journey, as fresh meat in great quantity was yet on hand at our home station.

In a ravine near the camp were two trees, probably coniferous, partly covered by earth. One was ten feet long and sixteen inches in diameter, and originally had two branches. The second tree was six feet long and twelve inches in diameter. They were about one hundred and fifty yards distant from Lake Heintzelman, and fully twenty feet above its level. Two-thirds of both trees were imbedded in the ground, and it was only with considerable labor that they were dug out. It seemed evident from their position that they must have been brought there as drift-wood, and gradually covered up by the earth washing down from the adjacent hill-side. Their presence, at an elevation probably three hundred feet above and eight or ten miles distant from the sea, shows without much doubt that within a tolerably recent period this valley has been an arm of the sea. Up to this point, and, indeed, for a short distance beyond, marine shells on the surface of the ground were quite common. While at this camp (No. 1) several flies were noted.

During this march no snow was seen except on the adjacent mountain-tops. Lake Heintzelman was covered, except a narrow margin of water, by thick honeycombed ice. The presence of such ice in summer indicates the permanency of a lake.

After nearly twelve hours' rest we moved onward, and at noon, stopping a few moments, I obtained latitude observations in the centre of the valley. At that time a high warm wind was blowing from the interior, and the temperature was considerably above 40° (5° C.).

As the wagon showed signs of weakness and the west side of the river was less rough than that on which we were travelling, we attempted, just above Lake Heintzelman, to cross the river, but found the water too deep for safe fording. Geese, musk-oxen, and a wolf were observed on the march, none of which were we able to obtain.

Seven hours' travelling over very rough ground "dished" a wheel, and lunch was taken while repairs were being made. About this time I saw many musk-oxen, fifteen in one herd, and three in another. In the vicinity of this spot the remains of dead willow existed in sufficient quantities to enable us to cook our tea with it.

About 5.30 p.m. we again camped, after nearly eight hours' travel, during which we made about sixteen miles. The valley at that time was a mile wide with tolerably level ground on either side of the river, which flowed first to one and then to the other side of the valley. Above the main level of the valley were occasional projecting plateaus—mesa lands or benches—which were some forty to fifty feet above the level of the river, but apart from these projecting benches it was shut in by high steep cliffs, of an elevation varying from fifteen hundred to two thousand feet. In its whole extent the valley was entirely barren of snow, and in most places was covered with a comparatively luxuriant vegetation. This consisted generally of willow, saxifrages, and dryas, though where the river widened, in occasional places, grasses or sedges to a height of ten or twelve inches were frequently noticed.

The only snow visible were drifts near or on the very summits of the cliffs, which encompassed the valley. In occasional places these drifts fed inconsiderable brooks, which in course of years had worn narrow beds through the scanty soil to the rocks which underlaid it. It would have been possible to scale these

cliffs only at such points as the water-courses had worn their way. My journal says: "Lake Heintzelman is about a mile and one-fourth wide at its lower, and three-fourths of a mile at its upper end, substantially filling the whole valley from cliff to cliff. The river from the lake to our present camp averages about two and a half feet in depth, and varies from twenty to forty yards in width."

Twelve hours' rest at Camp No. 2 put us in good condition. We cached one day's rations for the returning party and moved on, seeing some skuas and a wolf. A short distance farther, owing to the rough country, we were obliged to cross the river, which was done with some difficulty, as it was nearly two feet deep with a soft bottom. Shortly after two musk-oxen were seen, on the side of the river we had just left.

My field journal says: "The country now opens into a fine level valley about a mile and a half wide, covered in the main by a very considerable quantity of grass, which in its manner of growth and appearance resembles the bunch grass of our western prairies. In addition there are many young willows, saxifrages, dryas, etc. Enough dead willows can be gathered at almost any spot for the requirements of any sledge party."

A short march brought us to the junction of two streams, one of which flowed from the continuation of Black Rock Vale and the second from a valley to the left, nearly at right angles to that in which we were travelling. I decided to follow the latter valley, as it ran nearly in a western direction, and so must eventually bring us to Lake Hazen.

As travelling was bad and slow, while the party were following the main valley, I climbed a high hill, of about nine hundred feet elevation above the river, which promised a good view of the western country. Unfortunately other hills of nearly the same elevation cut off part of the prospect. I was able, how-

ever, to see a portion of the hog-backs to the northwest, which I designated as the United States Mountains, and a partly snow-covered range, somewhat to the southward of them, which I had named Garfield the preceding spring.

A fine hare, still in fur of perfect white, visited me while I was making my observations, and examined me curiously at a distance of a few yards. As I was not armed he escaped, but even had I been, I should have hesitated about killing an animal which, having such great natural timidity, had placed so much confidence in my kind intentions.

Crossing the main valley I reached the summit of the hill to the westward, which proved to be a divide of the water-sheds of the region, that to the west draining into Lake Hazen. The elevation of this divide was about 1,390 feet. From it I had a beautiful view to the westward, which showed four lakes between me and the eastern end of Lake Hazen. A glacier on the north side of Lake Hazen was also plainly visible to the naked eye, and showed up finely through the telescope. I there caught a butterfly, and saw three skuas, two bumblebees, and many flies (of three kinds), which, my field journal says, "are not as plentiful as yesterday."

A very strong wind with high temperature, about 45° (7.2° C.), interfered somewhat with my success in obtaining a set of circum-meridian observations, as the hill was totally bare of shelter. The latitude proved to be $81^{\circ} 49' N$.

As I passed down the divide to the westward, other lakes came into view, making eight in all seen during that day's march. After eleven hours' travelling, on the shoulder of a hill adjacent to Lake Appleby we made Camp No. 3, June 27th.

I quote from my field notes: "Private Biederbick saw two tern, of which one was shot, and a long-tailed duck. In addition, a flock of birds from twelve to fifteen in number, resem-

bling snipe, but unlike any other species seen by him, were observed, and also a butterfly. About a mile southwest of the divide Biederbick picked up a piece of lignite coal, which resembles that of The Bellows and of the mine in Watercourse Bay. It seems somewhat remarkable that this coal is so widely spread over the country and that we should find it on the watershed of Lake Hazen. I have observed reindeer moss in two places, of quite stunted growth, however. Private Whisler saw three long-tailed ducks and killed one, which, with the tern, flavors excellently our stew.

"I find that we are surrounded by a system of small lakes, which, draining from one into another, form a complete chain and finally discharge into Lake Hazen. The lake of highest elevation, temporarily named Rogers, drains into Lake Appleby, and that into Lake Biederbick.

"The chain of lakes discovered are permanent, as without exception they have a large central section of ice, the winter ice having melted this summer only at the edges.

"I have obtained time observations and bearings of the sun, from which the variation at this point is approximately 103.5° W. From the summit of the hill above the camp I can see part of Lake Hazen and the west end of John's Island. Quite a number of glaciers are in view, pressing through the gaps in the Garfield range, and what I take to be the higher part of Henrietta Nesmith glacier is seen in rear of the mountains.

"Later, Whisler, who had been hunting toward Lake Hazen, saw six long-tailed ducks and shot one. Lynn saw nine muskoxen within two miles of the camp."

I decided to examine the small lakes to the eastward, but in trying to reach the main ice in Lake Appleby, so as to cross it and avoid a long detour, I broke through its edge, and wet myself to my thighs, and later sent Biederbick in my place, while

drying my clothing. He returned after several hours' absence, bringing a rough drawing of the lake system as observed by him. He reported having seen about sixty long-tailed ducks, several flocks of turnstones, several king ducks, Brent geese, and a tern.

While at this camp, No. 3, we obtained but little sleep, owing to the large swarms of flies, which worried us very much. Biederbick and I slept in the dog-tent, but the great heat and the annoying flies broke our rest and made us thoroughly uncomfortable. On rising at 2 A.M. the temperature was found to be very high, 48° (8.9° C.), with a minimum of 47° (7.8° C.) since the preceding evening. We felt certain the temperature must have touched 50° (10° C.), which is a torrid heat for Grinnell Land. Dead willows were very plentiful in the vicinity of our camp, and we were able to cook entirely with them, and so reserve our small stock of alcohol.

In early morning the conditions of light were so favorable that from the hill-top, the outlines of five glaciers were plainly visible in the Garfield mountains.

At 3.30 A.M., June 28th, when we again started westward, the air was uncomfortably hot, with a temperature of 53° (11.7° C.). During this day's travel I found small pieces of lignite coal to be quite plentiful along the shores of Lake Kilbourne. In this lake also there were many small minnows from three-quarters to an inch and a half in length, several of which I caught. We crossed, between Lakes Kilbourne and Craig, a stream two hundred yards long and thirty feet wide, with an average depth of nine inches, which connected the two lakes.

Finding the distance very much increased by following the shores of the lakes, I decided to strike direct across the country, and in seven hours reached the mouth of the river by which

the lake system drains into Lake Hazen. Within a half mile of Lake Hazen I picked up a large reindeer horn.

As we were preparing to cross the stream a pair of long-tailed ducks was seen in the river, and both birds were wounded by Biederbick at the first shot. The male being the worst hit could not fly, and as ammunition was scarce Biederbick waited to get them together to kill them at a single shot. The female bird would fly away a short distance and then return to the mate in the stream. Attracted by her calls a second male came and settled in the water and was fiercely attacked by the first. The birds were so carried away by anger and passion as to lose all fear of man, their natural enemy, and allowed us unnoticed to approach to the river's edge within a few yards of them. During the fight which followed between the males the three were easily killed at a shot.

The river was crossed with considerable difficulty, it being quite wide with a muddy bottom, and we were obliged to carry most of the articles across on our backs, which was only done by wetting ourselves to our thighs. As the temperature of the water was but slightly above the freezing-point, our bath in it was by no means pleasant. While crossing the river a flock of king ducks and twelve musk-cattle were seen. Our route now followed the south shore of Lake Hazen.

The wagon, in the men's vernacular, was a "man-killer," and the rough, uneven road not only wrenched the men sadly by the sudden heavy jerks and joltings, but also threatened to break the vehicle down completely. By loading the knapsacks to their utmost capacity, and through the system of caching each day rations for the return journey the load on the wagon was considerably reduced. Frequent changes from knapsack to wagon work enabled fair progress to be made.

Marching a few miles farther two islands, parallel with each

other and with the south shore, were discovered in Lake Hazen, one a mile and the other about half a mile long. Opposite them I made camp No. 4, having travelled about twenty miles in ten hours.

In order to save fuel, the party scattered to collect drift-wood along the edge of the lake, which consisted chiefly of dried willows, but Corporal Salor brought in with his willows two small pieces of unworked pine wood. Sergeant Lynn, while gathering fuel, saw six musk-cattle on the northeast side of the lake, and near Camp Burgomaster—gulls, terns, geese, turnstones, a purple sand-piper, and many skuas were also observed.

During the day's march I noticed considerable reindeer-moss of somewhat stunted growth. Only very rarely had specimens been seen in the vicinity of Discovery Harbor, and even these beds near Lake Hazen were insufficient for pasturage.

The weather was so warm that all slept in the open air, disdaining our only covering—a dog-tent, into which four men could barely crowd.

On starting, at 12.30 A.M., June 28th, the temperature stood at 53° (11.7° C.), with a minimum of 46.5° (8.1° C.) since the preceding evening. While travelling along the lake I saw two ptarmigan, which were shot by Biederbick. One was in winter plumage of perfect white, but the other had slightly changed its snowy coat, being beautifully marked with delicate hues of browns and yellows which shaded into black.

Near by I discovered the former site of an old summer encampment of the Eskimos. It was situated about twenty feet above the level of Lake Hazen, and just over the brow of a low divide which separated the main lake from a slough, which had evidently in years past formed an arm of the lake itself. Searching carefully about a number of bones were found, and also pieces of unworked wood, besides a decayed sledge-slat of

pine or fir. The circles indicated that four tents had been pitched at this place. The surroundings of the encampment were marked by luxuriant vegetation of grass, sorrel, poppies, and other plants. Some specimens of the sorrel in this locality must have been from eight to ten inches in height, and they grew in such quantities that we plucked them by the handful.

A short distance beyond the encampment the party were enlivened by the appearance of a young hare, which we concluded to catch, as he took refuge in a mass of rocks. After quite an exciting chase by the whole party, I succeeded in seizing him. The high temperature then appeared, by our feelings, to be about 100° (38° C.), though probably about 60° (15° C.) by the thermometer, and these extraordinary exertions caused profuse perspiration, which saturated our clothing.

A short distance above this point, while passing around the sandy shores of a bay extending inland from the lake, I found two bone shoes for the runners of a sledge. There were five pieces of worked bone (of the whale), and the two runners were complete, except a small piece, about two inches long, which was missing from the end of one. The runners were imbedded about a quarter of an inch deep in sandy loam, which had gradually been deposited around them in past years by water from the lake. As found they were about two and a half feet below the highest level of the lake, as shown by the bordering fringe of gravel and drift-wood. It appeared surprising, at first, that they had not been buried entirely by the sand. While this might augur their recent abandonment, yet the fact that they were more or less covered, on their exposed parts, with mosses and lichens would contradict that theory. It seemed probable that high winds, sweeping along the level beach, would gradually uncover articles once completely buried, especially as the light covering, when dry, drifted. The deposit of sandy

loam was an extensive and level one, such as, from its appearance, had naturally formed from the action of the lake while yet under the surface of the water. The gradual subsidence of the lake in winter and the melting of the ice-foot the following summer left these articles undisturbed, while carrying away the wood.

In making noon observations at camp No. 5, which I reached some time in advance of the men, I found that my sextant case had evidently been stepped on the night before, and one of the shades broken and the instrument possibly injured. Later, on returning to the station, the injury was found to be such as did not impair the value of my observations. A poor set of latitude observations were obtained, owing to a very high gale, which had suddenly sprung up from the southwest, and also to the obscuration of the sun.

Camp No. 5 was established at the junction of Lake Hazen and Ruggles River, the place discovered by me the preceding April. The cache then left was found undisturbed.

On arriving at this camp it presented a delightful and pleasant aspect. The sky was partly covered with true cumulus clouds, quite rare in Arctic heavens; the sun marked with checkered bars of sunshine and shadow the babbling river, the large blue pool, and its noisy occupants; the temperature was high, and the gay yellow poppies and other flowers drew to them gaudy butterflies. If one but turned his back to the central ice of Lake Hazen, and the bursting glaciers from the ice-clad mountains northward of the Garfield Range, and gazed southward to the low brown hills faintly tinged with olive-green, he could well imagine himself in the roaring forties instead of eight degrees from the geographical pole. Four long-tailed ducks were noisily swimming and feeding at the junction of the river, and many turnstones, with a few skuas and terns, were

flying about. The whole hills on either side were tinged with green from the fresh leaves of the young willow and an occasional bed of dryas and saxifrages. At this point, and in its immediate vicinity, a large number of butterflies were seen, of which there were apparently three different species. They were so active and distrustful, however, that I succeeded in capturing but one during the day.

Having some leisure time before the arrival of the wagon, I examined carefully the surroundings of the camp. The flora appeared to be the same as that existing in the vicinity of Discovery Harbor, with the exception of two flowers, which were different from any others I had seen. Specimens were procured and carefully arranged, but unfortunately were spoiled during my return trip by being soaked beyond recognition while fording the many streams.

It is to be regretted that I had paid but little attention to Arctic flora, and in the press of other matters neglected to make a description of these plants. Another plant, of the heath family, was found in very large quantities, one or two specimens of which were sent back safely to Conger.

I was surprised greatly in discovering, against a vertical bank facing Ruggles River, three abandoned Eskimo huts, which doubtless had been occupied in the far past as permanent abodes. These houses were built from large fine pieces of slate, which were readily obtainable from the adjoining rocks. Many pieces of this slate, as large as three feet by two feet, were lying around, the thickness of which varied from three-fourths of an inch to an inch and a half. The Eskimo had utilized the steep, precipitous bank, against which the back of the houses rested and in which the chimneys were built.

The houses were six feet wide and ten feet long, though possibly they may have been longer, as the walls most distant from

the bank had fallen and partly disappeared, through being undermined by the river. The side walls of the structure were about three feet in height. Apparently the whole house had been covered with large pieces of slate, which served as a roof, for many such pieces were found in the interior space, which was partly filled by them. It is probable that the width of the houses depended on the size of the pieces of slate which could be used as a covering. No signs of a ridge-pole, or a wooden support to the roof, were to be seen. We carefully removed the flat slabs, and, digging among the dirt and moss, which was of considerable depth, found many relics and bones, which were most numerous near the chimney, or fireplace. Bones of the musk-ox, hare, and of various birds (and at least one kind of fish) were found in great abundance. Among other articles were three combs of walrus ivory, one of which had ornamental work on it, and whalebone fish-hooks (?), a bone needle (?), and pieces of whalebone, a shoe for a sledge-runner, and a number of other worked articles of bone and wood, the use of which were unknown. A selection was made from the bones, in order that it might be determined what species of animals had been killed by the Eskimo who had occupied this place. A piece of dog-skin of considerable size was also dug out, which had rotted to such an extent that it fell to pieces when handled.

The main party arrived at camp at 2 P.M., after more than thirteen hours' steady work, during which we had travelled about twenty-three miles.

A southwest wind prevailed all day, with cumulus clouds and a very high temperature, which I estimated to be 45° (7.2° C.) at 6 P.M., just after time observations had been made under disadvantageous circumstances.

At 2.45 A.M., June 29th, we started westward, with a very high temperature of 50° (10° C.). The equal altitudes, for

which I had delayed so long at the camp, were not obtained, owing to cloudy weather.

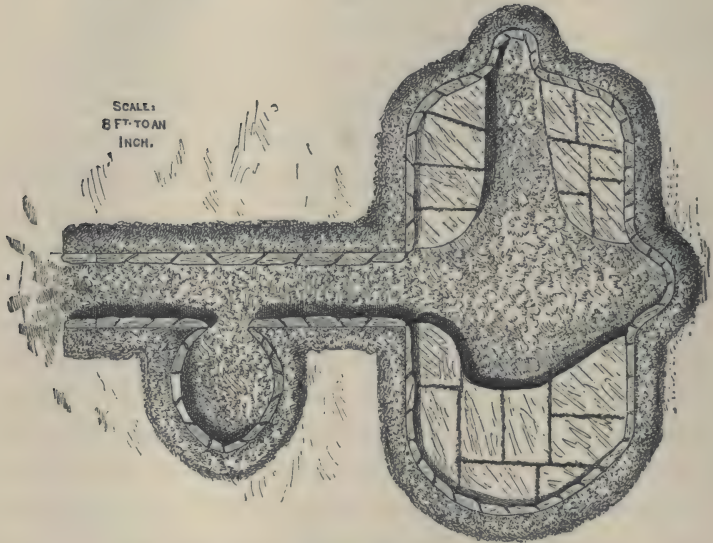
During the night Private Biederbick, from one of the adjacent hills, saw a large herd of musk-oxen, fully thirty in number, besides many calves. In the morning nine others were seen on the same divide, but to the west of Ruggles River, which indicated their being different animals from those seen during the night. A number of terns and long-tailed ducks were also flying along the open water. Ruggles River, somewhat to my surprise, was but little higher than in the preceding May, being knee-deep, with a rocky bottom, at the shallowest point, where we crossed.

After crossing the stream, about fifty yards from its mouth and the same distance from Lake Hazen, on our direct route, the remains of an Eskimo habitation were discovered by Private Whisler, I think. Its entrance passage, facing to the north toward Lake Hazen, was twelve feet long and three in width. About half way between the mouth of the entrance and the main hut was an opening to the right, a circular space which was five feet in diameter. It seems probable that this might have been the storehouse, or possibly have been intended for the use of dogs in winter. The main room was seventeen feet and four inches long by nine feet in width, being in the shape of an ellipse, the major axis of which was at right angles to the entrance passage.

One peculiarity of the house was the existence of two fire-places, one in the east and one in the south end, both of which had been built outward so as to take up no part of the space of the room. The sides of the entire habitation were low walls of sodded earth, which were lined inside by flat, thin slate, the tops of which, on an average, were elevated about two feet above the level of the interior floor. The interior next to the

walls was raised above the centre, forming a ledge, or bench, which, covered with flat slabs of slate, was probably used for sleeping purposes, similarly to the wooden platforms in vogue among the Danish Eskimo.

An hour was occupied in carefully examining these remains



Plan of Eskimo House, Junction of Hazen Lake and Ruggles River,
[From drawing by Lieutenant Greeley, June, 1882.]

and in digging in and about them at every place where it seemed probable that anything could be found.

Near this was the remains of what seemed to be a second habitation, of the same character, but of smaller dimensions. Near the end of the house was found what I at first took to be a grave. It was a place about four feet long by two wide, filled with moss and other vegetation of luxuriant growth, around the margin of which was a row of upright flat slate rocks which projected slightly above the surface of the vegeta-

tion. With much trouble we dug out the moss and the hard earth under it to the depth of a foot, when we found that the bottom was covered with flat slate stones. One or two of these were pulled up with considerable difficulty, but the only object which rewarded our labor was a small piece of worked bone, which had evidently been left there by accident. The conclusion to which we came after the examination, was that it had possibly been the provision cache, which was thus arranged to secure the meat from the dogs, but of this we felt by no means certain.

In the two houses and in the immediate vicinity we collected about forty pieces of wood and worked bone. Among other articles were one large and two small narwhal horns, two walrus-ivory toggles for dog-traces, such as are now used by the Greenlanders ; an arrow-head, two bone handles, a skinning-knife with bone handle and iron blade, a bear's tooth, whalebone shoes for the runners of two sledges, and a wooden upstander with a carefully made and well-fitted bone top. Several sledge-bars, some of bone and others of wood, and a complete wooden sledge-runner, which was very heavy, being five feet long, nine inches high, and over two inches thick, were also discovered.

Among other pieces of wood was a pole, nine feet long and about two inches in diameter, of a hard, close-grained, coniferous wood, probably fir or hard pine. Parts of two wooden sledge-runners were badly rotted, but one was yet in fair condition.

There were several articles of worked bone whose use I could not surmise, and the character of which were unknown to our own Eskimo. The bone articles were of walrus, narwhal, and whalebone, the first being the predominating material, from which small articles had been made. Musk-ox and hare bones were very plentiful.

"It appears evident," my journal says, "that these Eskimo

had dogs, sledges, arrows, and skinning knives, and fed on musk-oxen, seals, hares, and occasionally fish. While this habitation does not appear to have been covered with stones, as were those found by me on the east side of the river, yet the arrangements indicate more than a summer encampment."

It is more than probable that these habitations were covered with skin roofs, which must have been secured in a different manner from the Greenland method, as no circles of stone were found. The construction of these houses certainly entailed a large amount of work. In quitting them, the roof and its supports must have been entirely removed. It is possible that the long pole found may have been used in some manner as a support for the roof. It is extraordinary that, in abandoning this country, they should have left behind the pole and the sledges, which were very valuable, unless, indeed, their dogs perished there. The depth at which the dog-toggles and other bone articles were discovered indicate their having been left by accident where found, as they were covered by *débris*, which evidently accumulated during the occupancy of these huts.

The surroundings were carefully examined for graves, as during the occupancy, covering at least two years, of habitations of such size it was likely some one must have died. No traces of any human remains could be found, nor, indeed, of the dogs; but, in the case of the latter, their uncared for remains would have been devoured and their bones removed by foxes or wolves. It is pertinent to remark that musk-ox or other expected bones were rarely found in Grinnell Land.

Nearly an hour was spent in the examination of these remains, after which we started westward. From an adjacent hill I plainly saw that the valley north of John's Island, visited by Bender in April, was filled with a glacier, the front of which, however, is three or four miles distant from the lake. Exam-

ining the valley with a telescope, it was plain that the glacier discharges into Lake Hazen by a river opposite the eastern end of John's Island, or behind a range of low hills near by, but the former seemed to be the more probable point. A second glacier, a little farther to the westward and about five miles distant from the lake, probably discharges by a river opposite the middle of the same island.

During this day's march I found a large reindeer's antler, and Corporal Salor saw a bumble-bee and a "devil's darning-needle." Butterflies were very numerous, as many as fifty being seen during the day. After six hours' travelling I stopped the party for lunch, during which I took a set of circum-meridian observations and compass bearings of the important points. The place where we lunched was also the farthest for Salor and Whisler, who were turned back to the home station, as their farther presence would have been of no benefit to us. With this view their blanket sleeping-bag had been left at camp No. 5, to which they returned during this march.

The weather during the day was excessively hot, and we suffered extremely. The attached thermometer of the aneroid barometer, which was carried always in the shade, stood at 74° (23.3° C.), and the exposed thermometer, though swung repeatedly for seven minutes in the air, could not be got to read lower than 73° (22.8° C.). This temperature was certainly a very remarkable one to be experienced in such a high latitude, but I am confident as to its reliability within one or two degrees.

After eleven hours' marching we made camp No. 6, on the eastern bank of Cobb River, a narrow, rapid stream about two feet deep, which drains the country to the southward.

The day's march carried us farther along the shores of Lake Hazen than I had reached in May, and now a new, undiscovered country was gradually opening to our view.

While dinner was being prepared I ascended a hill to the southward, which was by barometer four hundred feet higher than the plateau on which we camped. From this point I could plainly see that Cobb River for about four miles flows from the south, and by a break in the hills I judged its upper portion to come from the east, thus draining the country to the southeast. To the southward the hills gradually rose to an elevation of two thousand feet, but in all the extent of country within sight there was no snow or ice, except such as was to be seen in the centre of Lake Hazen, or visible in the form of glaciers flowing down through the valleys of the Garfield Range.

On an adjacent hill, about three hundred feet above and commanding an extensive view of the lake, I found an Eskimo meat cache, near which were signs of fire, although no burnt fragments of any kind remained, probably having been swept away by the high winds.

My field notes say: "During our day's travel the wagon-wheel has dished twice, and is in bad condition, but we hope to get it a long distance to the westward, though we shall undoubtedly be obliged to pack all our effects in returning. Several musk-cattle and a number of hares have been seen to-day, though we have not been fortunate enough to obtain either. The musk-cattle did not appear to mind revolver shots at forty or fifty yards. The birds seem to be disappearing, as we have seen only a duck and a goose during the day.

"At 4 P.M. the temperature of the air was 67° (19.4° C.) in the shade. In order to determine it correctly, I plunged the thermometer in the river, and was surprised at the temperature of the water being 45° (7.2° C.). The only inference to be drawn is that the river must flow a long distance from the supply of snow which feeds it. The thermometer, after being taken from the river and carefully wiped, rose slowly in the

shade to 64° (17.8° C.), which must be accepted as correct. The very high temperature of the air to-day explains the temperature of the river, and we cannot do otherwise than believe that the temperature of the interior of Grinnell Land must be considerably higher in summer, and correspondingly lower in winter, than the coast regions.

“Vegetation is very luxuriant at certain spots passed to-day, but in the immediate vicinity of our camp the willow was scarce, and so supper was cooked with alcohol. We were able to collect sufficient wood to cook our morning meal.”

Two herds of musk-oxen, of four and five heads respectively, were seen just after leaving camp, and later three other herds, aggregating thirty-one head. Four revolver shots were fired into a large bull within a distance of twenty feet, by Sergeant Lynn, but the animal escaped.

We had much trouble with our wagon, the wheel dishing frequently, and after about six hours' labor, during which frequent stops were made to repair it, I concluded that nothing was to be done but abandon the vehicle and travel with packs. With a view to this contingency, knapsacks had been brought with us.

On one occasion, while the wagon was being repaired, I had a fine view of Henrietta Nesmith glacier, which was directly north of us. The glacier was examined carefully with field-glass and telescope. The main glacier is formed from five streams of ice pressing downward from the ice-cap in the rear of the Garfield Range. A tributary of the glacier flows in from the west about four miles above the snout, and the second and third from the northwest about seven and ten miles respectively inward. The main stream of ice comes nearly from the north, being separated from the last tributary by a rounded mountain spur which cuts off the horizon in that direction, but in all other quarters was an ice-horizon.

The break-down of our wagon was a great draw-back to our success. We had travelled over a hundred miles from Conger, and I expected to make an equal distance farther to the west. With packs our distance must be now quite limited, but we accommodated ourselves to the new order of affairs.

After a hearty lunch I directed Lynn and Biederbick each to take what they thought they could carry, and I did the same. Lynn took forty-five pounds, Biederbick fifty-seven pounds, and I thirty-one pounds, as our regular loads. My load was smaller than the others, through my inability to put anything additional in it, or on my knapsack, for fear of injuring my sextant. Besides the combined loads, a bag of hard bread weighing over thirty-seven pounds was taken, which was to be carried alternately by Lynn and Biederbick, who were occasionally relieved by me. By this arrangement Lynn carried half the time eighty-two pounds, and Biederbick ninety-four pounds, while I occasionally carried sixty-eight. These loads, if they could be carried, enabled us to start with sixteen days' rations of twenty-nine ounces solid food—insufficient for proper nutrition, but we thought we could make it do. We took no tent, but simply a blanket sleeping-bag large enough for the three, and no clothing besides that in wear, except dry stockings.

Opposite Wagon Hill, where the wheels were abandoned, were two small islands, one of which was named Dyas Island. Having so arranged the articles abandoned that they would be safe from foxes, and placed the wagon so prominently that it could be easily found, we shouldered our packs and again turned our faces to "unknown regions."

CHAPTER XXIII.

SUMMER EXPLORATIONS (*Concluded*).

WE soon crossed a river, an important tributary of the lake, about a hundred yards wide and eighteen inches deep, flowing with great rapidity. We were wet above our knees, much to our subsequent discomfort in travelling.

Ten musk-cattle were seen shortly after, on one of which the revolver was tried without effect. This herd was grazing in the vicinity of several summer ponds which had formed on the plateau a short distance from Lake Hazen. The vegetation was the most rank I have seen in the polar regions. Grass in considerable quantity grew at the margin of these shallow lakes to the height of eighteen or twenty inches.

The heavy loads, and the rough character of the country over which we travelled, exhausted us about ten hours after leaving camp No. 6, during which time we had marched seventeen miles. It was evident that Biederbick, and possibly Lynn, was overloaded. The former, ambitious to do his very best, sadly overtaxed his strength during the day. We accordingly made camp No. 7 near Lake Hazen.

Being anxious as to our prospects, I walked some four miles to the westward to the summit of a very prominent hill, whence could be seen a break in the low hills indicating a valley, from which issues a river that empties into the northwest end of Lake Hazen. The Garfield Range appeared to end a short distance to the westward, there being seen beyond Mount Whisler

MAP OF

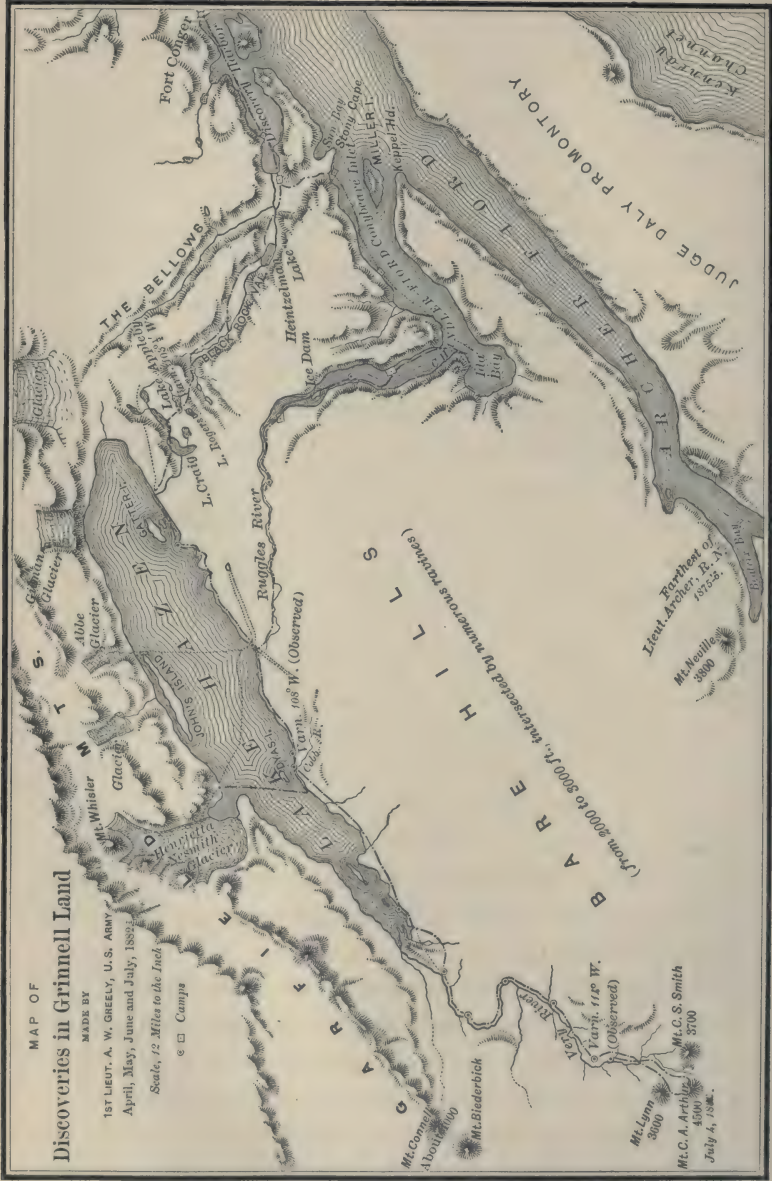
Discoveries in Grinnell Land

MADE BY

1ST LIEUT. A. W. GREELY, U.S. ARMY
April, May, June and July, 1893

Scale, 12 Miles to the Inch

□ Camps



only one mountain, of considerable less elevation (Mount Connell).

During this side trip I found a piece of untanned reindeer-skin, two inches by one inch in size, with a piece of sinew still attached to the inner side. The hair was firmly attached to the skin, and the whole piece was in an excellent state of preservation. My journal says: "It does not seem to me that it could have been in its present place over four or five years. One of the edges seems to have been cut with a knife. There was no snow in the valley where it was found."

We cached at camp No. 7 a day's return rations and all our alcohol, as the small cooking-lamp had been lost since leaving the wagon, and so lightened our load about twenty-three pounds. We readjusted the weights, also, as far as practicable, Lynn carrying forty-seven to sixty-eight pounds and Biederbick fifty-one to seventy-two pounds, there being a package of twenty-one pounds which was carried by them alternately.

We came to another river, twenty-five yards wide and two feet deep, which we succeeded in crossing near the lake, where it was a quarter of a mile wide and so shallow that the water did not go over our boot-tops. Light rain commenced shortly after, and, to avoid being soaked, we rested under the side of a large rock and protected ourselves by stretching the sleeping-bag over our shoulders for some twenty minutes. Crossing a high, rocky hill we came to a broad valley, where a wide, swift river, knee-deep, flows into Lake Hazen from the south. In crossing this river we were wet to our thighs and left in a very uncomfortable condition, as the water was icy cold.

We saw shortly afterward a herd of fourteen musk-cattle, which were too wild to be easily approached.

Leaving this valley we reached the summit of a broad, high ridge, some four hundred feet above the level of Lake Hazen.

This afforded a fine view of a second valley (Very Valley), which, though two or three miles wide, seemed narrow on account of the lofty, precipitous hills which enclose it.

We descended into Very Valley with great difficulty, owing to the precipitous sides, and made camp No. 8 near the river which was flowing through its centre, which I had named Very River. I camped early, after eleven miles' march, as Biederbick showed signs of illness and was quite worn out with his heavy load, although I relieved him a little at times. He thought that if we rested a while he would be able to proceed. The work was very trying on Lynn and myself, and we were but little less exhausted than Biederbick.

My journal says: "We are camped about two hundred yards south of Very River—a broad stream which divides into many channels opposite us, leaving an island of considerable size which I have named Biederbick Island. About four hundred yards up the river from the camp the streams flow into one channel, which, in its half mile of width, shows no break or flats. A second river runs parallel to it, and from the high cliffs back of our camp was seen to be separated from Very River for six or seven miles by a narrow ridge, which was some three hundred feet in elevation. This second river, named Adams, rises to the northwestward, and evidently drains the country in that quarter, as it flows through a break between the Garfield Range and a distant range of mountains to the west, which I have called Conger Mountains. This unites with Very River a mile or more to the westward of Lake Hazen. The valley of Very River, as seen from here, is about twelve miles long and averages one and a half miles in width. While the hills southward of Very River are but three hundred feet high, those to the northward of Adams River rise up sharply to an elevation of a thousand feet or more. Back of these high hills

appears the Garfield Range, through occasional depressions of which are visible the hog-back peaks of the United States Mountains covered with eternal snow or ice."

Our stay at camp No. 8 was very uncomfortable, as occasional light rain fell for seven hours, which saturated us, we having no protection except a blanket sleeping-bag covered with light canvas. I delayed until 6 p.m., hoping for latitude and time observations, as well as the improvement of Biederbick, but was disappointed in all respects. I finally decided to send him to Conger, and proceed with Sergeant Lynn.

Biederbick was ordered to return to the wagon, where he could protect himself with the shelter-tent, and was furnished with a fire-proof tin and cup for cooking utensils. At each cache he was to leave a note of his condition. "I feel doubtful," says my journal, "about permitting him to return alone, as we are a great distance from the home station, but he insists upon his ability to reach it safely, and begs that his sickness may not interfere with the success of my journey."

Just as I was leaving the camp the clouds broke, and I succeeded in getting an indifferent set of time observations. While at this work we saw five birds, which I examined carefully through a glass, as did Sergeant Lynn. We decided that they were of the plover family, and were not golden plover, but from the rings around their necks we concluded they were the ringed species. Their plumage was ashy gray, with a well-marked white band around the neck, and I should have considered them the ringed-neck plover, *Aegialitis semipalmata*, but as that species was not probable, I concluded they must be *Aegialitis hiaticula*.

Starting from camp No. 8, Lynn carried sixty-four pounds and I forty-seven, which gave us ten days' short rations. After an hour's travelling, while taking bearings, I found that the

fire-proof cup for cooking purposes had been lost by me, through the strap of the haversack becoming loose. Sergeant Lynn went back to find it, and, after an absence of nearly two hours, returned unsuccessful. He found on the way a nest of five small eggs, which he cached for our return. We supposed them to be of the plovers seen by us, though somewhat doubtful of it, as they seemed too large for so small a bird, being over an inch long.

While he was gone I collected a quantity of dry willows, with which I succeeded in drying a portion of my wet clothing.

We marched but nine miles, and at 1 A.M., of July 7th, we made camp No. 9 on a plateau overlooking Very River, where we were driven on account of quite heavy rain falling, evidently the western edge of a rain-storm which was well marked toward Lake Hazen. While camping eight musk-oxen were seen on the northwest side of the river.

We remained in our bags ten hours, getting but little sleep, owing to our clothing, which was very damp and in places saturated. Quitting our sleeping-bag, and ascertaining that our butter-can was fire-proof, we hunted up wood, and in a few minutes had a warm stew of pemmican.

Cloudy weather interfered with satisfactory circum-meridian observations at this camp.

At noon of the 2d we travelled along the valley on a broad plateau, which was about half way between Very River and the high, precipitous cliffs to the southward. An hour's march brought us to a point where a fine landscape was in view. My journal says: "A broad cañon-like ravine shows up to the north-eastward, through which flows a river that evidently rises in the country west of Mount Whisler. Through the low space of the ravine snow-clad hills and mountains show up beyond Mount Whisler. The last mountain rises sharply above the high cliffs

to the northward of Very River. In one ravine the front of a large glacier was visible to the westward of Mount Whisler." We saw here five herds of musk-cattle, aggregating thirty-one head, one herd of which had several calves.

A few miles farther the valley narrowed, and I thought it advisable to stop for tea, as we had taken none in the early morning, and the character of the country appeared about changing, so that dead willow might eventually disappear. While tea was being made I walked ahead to a prominent point. My journal says: "The stones are very sharp and thick, and the banks of the river very precipitous. In one place the stream comes up to the plateau, and a fresh landslide of two hundred yards has recently fallen into the river, which at that point seems very deep. At the point reached by me the stream nearly fills the valley, a quarter of a mile in width. The river flows now from the south, much to my disappointment, and, from the configuration of the hills and country ahead, it seems to me to derive its source from a second lake like Lake Hazen. Beyond this point we had hoped the branch would flow from the south and the main stream from the northwest. At times we have already been driven to precipitous hills, and again, owing to their steepness, into the edge of the river itself, to make progress."

Tea over, we started southward, with the temperature at 40° (4.4° C.). As fog had set in we were unable to see the country to the westward. A short distance beyond we met with a large tributary coming into the river from the east, a rapidly running stream from two to three feet deep. We followed up this river for a quarter of a mile, but the chances of crossing did not improve, and we were driven to ford it, which was done with difficulty. The current was so strong, and the bottom so rough, that thrown on some protruding rocks, I was not only soaked

to the waist, but sprained my right wrist slightly. Sergeant Lynn, crossing in another place, escaped with few bruises, but was soaked to the thighs. My journal says: "The stream, from its gradient, cannot come from any great distance, although the volume of water in it is very great."

About a mile beyond this tributary we came to a place where we were unable to follow the river, owing to the abrupt character of the banks, and to proceed farther it would be necessary to scale a very precipitous hill. The fog had turned to rain, and we were in such an uncomfortable and wretched condition that I concluded it would be best to make camp No. 10, although we had travelled less than eleven miles.

We obtained seven hours' unsatisfactory rest at this camp, and after a luncheon of bread and pemmican, washed down with ice-water, cached a day's provisions for our return journey and started onward. My sprained wrist pained me greatly, scarcely permitted me to make notes, and interfered seriously with my progress over the crest of the hill, which was so steep that it could only be climbed with great exertions.

During this march we saw a ptarmigan and heard a snow-bird, the last birds toward the interior.

The day's travel was made over a wretched route, as the river filled the whole of the narrow valley, except in occasional places where rapid tributaries entered the main stream. Our pathway lay either over projecting ledges at the edge of the river, or along steep hills of loose, broken rocks which were scarcely passable. Several tributaries were passed during the day, and at the junction of one we were driven by rain to the sleeping-bag for a short time.

Six hours' travel from camp No. 10 we put foot on the first snow found, or indeed seen, by us, except on very high hill-tops, since leaving Fort Conger. It was a mass of ice overlain with

snow, seemingly the beginning of a small glacier. A few miles farther the country was more open, the hills became lower, and the valley widened. Snow in considerable quantities was now frequently met with, and, finding a comparatively dry spot on a high plateau, we made camp No. 11, after over eight hours' march, during which we travelled eighteen miles. I was just in time to get a poor set of circum-meridian observations. We were much exhausted by our exertions, as we had travelled at our best gait despite the rough road, hoping and expecting hourly to reach the summit of Grinnell Land.

Frequent rain, which in some places froze as it fell, kept us in our bag for seventeen hours. The confinement, while affording us considerable rest, was very severe, owing to the low temperature, and the fact that sleeping-bag and clothing had now been constantly wet for three days. We had no fuel with which to warm our food, but as it was the 4th of July, we celebrated the day by a half gill of rum and lime-juice combined, and after eating a piece of pemmican and hard bread travelled on, caching a day's provisions for our return. Before leaving the clouds fortunately broke, and I was able to obtain observations for magnetic variation, which proved to be 114° W.

Crossing another tributary we found the main river largely reduced in size, and the greater part of the country covered with wet snow, underlain with mud and water. After about three hours' travel, having reached a dry spot on the summit of a small hill, which was like an oasis in a desert of snow, we dropped at that point our sleeping-bag, and everything but glasses, compass, and a lunch, and started to ascend a high mountain which was in view a few miles to the southwest.

We found the walking very heavy, the snow nearly knee-deep, with water half a foot to a foot deep under the surface of the snow. Occasionally we were able to find a bare spot

of ground where soft mud about two or three inches deep was equally as trying as the snow.

At the base of the mountain, which I named Mount C. A. Arthur, the river divided into two large brooks, one of which sprang from a deep ravine in the very heart of the mountain, and the other from a narrow valley between this mountain and Mount Lynn to the northward. At the junction of these brooks, which was reached at 11 A.M., the barometer stood at 27.17. After two hours' steady climbing, I reached the summit of the mountain in a thoroughly worn-out condition. The barometer stood at 25.35, indicating an ascent of over eighteen hundred feet, and an elevation above the sea of forty-five hundred feet.*

The travelling was of such an exhausting character that Sergeant Lynn was unable to follow me, and after wading about a half mile in snow four feet deep, underlain with water two feet deep, he was so worn out that I sent him back to the junction of the brooks, where he was ordered to await my return. In my tired condition I could never have reached the top, except as a matter of honor and duty. Frequently I crawled on my hands and knees a long distance; at one time as far as a quarter of a mile. At times I threw the glasses ahead of me, so as to make it certain I should proceed. When about fifteen hundred feet below the summit of the mountain, travelling improved, as the underlying water disappeared.

When I was about a half mile from the top farther progress

* I think Mount Arthur the highest mountain in Grinnell Land, it being by barometrical measurement fifty feet above the highest peak of the Victoria Range ascended by Lieutenant Lockwood. Mount Grant has a greater height on the late Admiralty chart, but on somewhat doubtful authority, as it was never visited; and Nares, on his original map, says, "estimated height about three thousand feet."

seemed impossible. My strength failed me, my sight dimmed, and my throat became parched and thirst intolerable, while perspiration poured off me profusely. I revived myself by rest, and by eating snow, a doubtful expedient even in summer. After that I could walk only a hundred, and later fifty, steps at a time, but finally the summit was reached.

As I had been travelling for over five hours with my boots filled with ice-water, kept at the lowest temperature by the snow, I found, on reaching the summit of the mountain, that my left foot had lost all sense of feeling, and that there was but little sensation in my right. Knowing the danger of perishing by freezing, I kept moving steadily, as that was my only safety.

The summit of the mountain was a level, unbroken expanse of snow, about a half mile in diameter. I was unable to get any satisfactory compass bearings, as when sitting down to the compass no peak could be seen in any direction. I had no snow-knife or other instrument with which to erect a pedestal. I attempted to take bearings standing, but all were unsatisfactory, and in consequence I located everything with relation to the sun. When within nine hundred feet of the top, at the base of the main cone, the surrounding hills were so high that no view beyond them was possible, but from the very summit the view was a remarkable and extensive one. There was no doubt of my being on the crest of Grinnell Land, where the farther side drained to the western Polar Sea.

My journal says: "The whole country seems spread out before me as on a map. A second chain of mountains (Conger Mountains) is seen extending to the westward as the prolongation of the Garfield Range. They are separated by a break of eight or ten miles from Mount Whisler, which is the most westerly of the Garfield Chain. Northward of the Conger and Garfield Ranges are a confused mass of hog-back mountains, all

entirely snow-clad, which I include in the designation of United States Mountains. The valley northward of Mount Whisler extends to the eastward about half way to Henrietta Nesmith glacier, and from that point to the eastward the rest of the Garfield Range is crowded closely against the United States Mountains, evidently being the only obstacle which prevents the glacial ice-cap from overflowing the country to the southward. The overlapping, rounded tops of ice-clad mountains can be distinguished for at least twenty miles to the northeastward beyond the Henrietta Nesmith glacier, which must be nearly forty miles distant itself.

“To the westward the valley between the Conger and United States Mountains opens out or widens in that direction. The mountains themselves, after extending a great distance, trend gradually to the northwestward, probably terminating in the Challenger range of Aldrich.

“With the following exceptions, there is visible as far as the eye can reach, say fifty miles, only low, rounded hills intersected with numerous ravines, which, outside of a radius of ten to fifteen miles from Mount Arthur, are generally bare of snow. By low hills are meant those from fifteen hundred to twenty-five hundred feet high. Did not the country in all directions resemble to the eye that which I had just travelled over from Lake Hazen, I might think it a plateau country, as was supposed by Lieutenant Archer. The most important exception is from the west-southwest to southwest, where a depression in the hills discloses a range of partly snow-clad mountains, distant not less than, and perhaps much over, seventy-five miles. I cannot but think this depression drains the western country into a channel or strait between the near hills and the distant mountains, and that the range is situated on a separate land.”

The north and south ends of the range were cut off from

view by the hills, but it can not in any way be joined to the Conger Range. Again, due southward was seen, about forty miles distant, a prominent mountain rising sharply on its eastern point and showing a flat top, which extended westward and gradually (perhaps from perspective) merged into the low hill.

In the southeast there was a prominent peak, with a few illy-defined snow-clad mountains, evidently the western slope of the Victoria and Albert Range.

Eastward appeared what I took to be Mount Neville, of Archer, while the very top of a slightly lower peak to its north was clearly visible, the lower part, however, covered from view by a pencil or low bank of level clouds, which seemed to lie along Archer Fiord and extend a great distance to the westward. This low line of clouds was doubtless mist rising from the face of the southern ice-cap, similar to the veil of mist seen a few days later in front of Henrietta Nesmith glacier. Its presence prevented my discovering this ice-cap, which was so successfully traced by Lieutenant Lockwood the following year. Except this low-lying cloud, the air was very clear, in the condition known to meteorologists as visibility.

It was evident to me that no sea could be reached that trip, and that farther travel would add nothing to our knowledge of the country, as we could hardly hope to proceed farther than twenty miles at the most.

During the twenty minutes I was on the summit a cold northwest wind sprang up, which chilled me through and warned me to leave. Constant movement was necessary to prevent me from freezing, and, as it was, my damp clothing was covered with thick hoar-frost in a few moments.

I had ascended the southeast side of the mountain, where the gradient was easiest, but I decided to descend on the north side by a direct route toward Mount Lynn. Near the base of the

mountain I found a remarkable line of almost vertical snow-banks and drifts, the front of which ranged from a hundred to a hundred and fifty feet in height. Being worn out with fatigue and cold, and to save a long detour, I concluded to chance a bad fall by descending the drifts, and so slid down at a place a hundred feet high, fortunately landing in deep, soft snow.

The first bare ground reached was about nine hundred feet below the summit, the barometer reading 26.05, which made the snow-line about thirty-eight hundred feet above the level of the sea. No earth capable of vegetation was seen on any part of the mountain or at its base, although on the southern side of Mount Lynn lichens and purple saxifrage (*Saxifraga oppositifolia*) were seen.

I rejoined Sergeant Lynn at 2.20 P.M., and my left foot, without sensation for a couple of hours, was vigorously treated by Lynn until the circulation and sensation returned.

Our flag was displayed from the summit of Mount Arthur, but as the rum and lime-juice were carried by Lynn, we were obliged to drink the health of the President, Our Country, and the Day at the base of the mountain instead of on the summit, as we had planned. A small cairn was erected on the side of Mount Lynn, about forty yards above the junction of the creeks, and carefully inserted in one of my shoulder-straps was left a brief record of our visit to the mountain.

We reached the camp quitted that morning, after twelve hours' absence, exceedingly fatigued by twenty miles' travel and very uncomfortable with wet clothing and cold feet. I succeeded in obtaining a set of equal altitudes that evening and the following morning, which, with the latitude obtained near the camp, satisfactorily determined our position.

I desired to examine the country to the eastward before returning to Fort Conger, but the condition of our foot-gear pre-

cluded this work. Lynn's boots were in a very dilapidated condition, and my own were but little better, so, after a few hours' sleep, we turned our faces toward home. Two hours' travel carried us beyond the last snow, where tracks and traces of musk-cattle were observed, one calf being among the number, and near by the first live willows were seen. This proves that the musk-ox crosses at times to the western shore of Grinnell Land, even if he has not migrated to Greenland from the Parry Islands by way of the western instead of the southern shores of Grinnell Land. Many butterflies were observed during the day. At one point we were delighted by the sight of four beautiful snow-clad peaks, visible to the northwestward through a break in the low hills. A snow-bunting was also heard, the only species of bird found until Lake Hazen was again reached.

After nine hours' steady and rapid travel we made camp No. 13, "having travelled about twenty-two miles over an exceedingly rough road. Our very light loads have enabled us to pass by routes impracticable with heavy packs. What is left of our boots has hardened through alternate soaking and drying until they are like cast-iron. Lynn's ankles are very badly galled; my own less so. We are now camped opposite a large tributary of the Very River, which was not seen by us on our outward trip, owing to fog veiling it as we passed. It flows from the westward, and has been temporarily named W. H. Lewis River. Through its broad valley a number of partly snow-covered mountains are visible. We are now enjoying a bright sun, which, for the first time in five days, permits us to dry our clothing. We are also eating our first warm food in four days.

"After taking a set of time observations we had dinner, and since then have devoted some time to repairing our clothing, which is badly torn. I visited the river-side a short time since, with a vague idea of crossing and examining the opposite valley,

but Very River was so deep and swift that I dared not venture into it. It was perhaps as well we could not cross, as our boots are now worn so thin that the stones seriously bruise our feet.

"I am much surprised at the large amount and the luxuriant character of the vegetation in this valley. There are extensive patches of thriving green willow, which cover the ground for hundreds of square yards. In other places saxifrages, dryas, Arctic poppies, and bunch-grass are equally abundant. Dead willow is to be found in large quantities, some of which is two inches thick at the base.

"The steep cliffs on the western side of Very River are shaded in various tinges of green, which, well marked, prove the existence of willows or luxuriant mosses on the shoulders of their sharp slopes.

"We are now stretched out on a spot of dry sand, with bright sun, no wind, the temperature about 50° (10° C.), plenty of grass and water, and a bright fire before us. The green hills, fertile valley, and mountains devoid of snow, except upon their very summits, rather impress me with a feeling that I am camping in one of our Western Territories, and not in latitude $81^{\circ} 30' N.$ "

On July 6th we travelled steadily for over nine hours, and succeeded in covering the same distance as was made in two of our outward marches. Our camp was made very near camp No. 7. We passed an unsatisfactory night, however, as we had necessarily wet our lower clothing in fording the many streams, and a high cold gale blew all night. I was so worn out and uncomfortable that I slept only while breakfast was being cooked, perhaps three-fourths of an hour.

From our camp the Henrietta Nesmith glacier presented a beautiful appearance. It was concealed from view the greater part of the time by a veil of rising vapor, which, driven by the

high wind eastward, allowed the ice to show up most picturesquely through the torn rifts of the forming cloud.

July 7th we passed the abandoned wagon, where a note from Biederbick reported his arrival and departure in fair condition. We took what was possible from the wagon, and in twelve hours, by taking all short cuts possible, reached the junction of Ruggles River and Lake Hazen. We travelled a steady gait up hill and down, over bad road or good, determined to take no rest until we should retrace the distance travelled in two days' outward journey.

On reaching that river I found it had risen considerably since we went west, and now was of such a depth, with so swift a current, that it was not pleasant to think of fording it.

During the day Lynn had carried seventy pounds' weight, and I about sixty-five. My zeal for science was sadly tried this day by a patent plant-press, in which were carried botanical specimens. In whatever conceivable manner I arranged the press, it speedily admonished me that it would carry easier in any other position. I once turned it over to Lynn, and took in its place five times its weight, but, after watching his despair for several miles, received it back, and did penance the rest of the march. At the end of the day, sad and bruised, I took out the plants and laid the press carefully on a boulder, where it probably remains to this day.

Of the relics at Ruggles River, Salor and Whisler had been ordered to take as many back to Conger as they could carry. We found remaining from one hundred and fifty to two hundred pounds' weight, which, unfortunately, was on the wrong side of the river. Stripping off our lower clothing and taking about a hundred pounds' weight, I entered the river first, finding the current so strong, that if I had not been weighted down I could scarcely have crossed. The water reached my hips, and



ESKIMO RELICS FOUND AT JUNCTION OF RUGLES RIVER AND LAKE HAZEN, JULY, 1882.

(From a photograph.)

was at a temperature of 32.6° (0.3° C), just above freezing. I had intended recrossing the river to bring over the balance of the relics, but I was unwilling to venture back into such water and strong current in the face of a southwest gale, and was equally disinclined to expose Lynn to danger and discomfort. I ordered him to secure, on a high spot of land, all the relics he could not carry in one load, and to cross with the rest. In consequence we left two runners (one of which, of heavy coniferous wood, was about six feet long, eight inches high, and two and a half inches thick), two poles, a reindeer antler, and several worked pieces of pine wood.

We got, at the earliest moment, into our sleeping-bag where we passed a bad night, getting but little rest and less sleep. Our wet clothing, the low temperature, and high wind made us wretchedly cold and uncomfortable. To add to our discomfort, occasionally dashes of rain wet our sleeping-bag and prevented our clothing from drying out.

I decided to abandon all unnecessary food and other articles at Ruggles River, in order to carry to Conger, a hundred miles distant, the relics we had found. We started about 1 A.M., July 8th, heavily laden with whalebone, etc. At times the route along the lake-shore was so winding that we travelled inland to shorten the distance, and, in so doing, discovered several considerable lakes about a mile to the south, which drain into Lake Hazen through small brooks. During the day several musk-cattle and ducks were seen, and a young turnstone was caught by me.

The day's work was a very hard one, as each of us was carrying between sixty and seventy pounds, and the country passed over was quite rough in places. Rain fell occasionally during the march, wetting our clothing sufficiently to chill us thoroughly when clearing weather and strong wind followed.

Several of the small valleys, in the vicinity of the discovered



SEA FACE OF ICE FOOT AT DISTANT CAPE.

(From a photograph.)

lakes, were filled with luxuriant vegetation, among which frequent large beds of heather, with their delicate white flowers, were particularly noticeable. This species was seen in no other portion of the country, except in a favorable spot on Bellot Island.

Nearly ten hours' travel brought us to the river which drained the chain of lakes into Lake Hazen, and there we camped on the farther side, so worn out by previous hardships, that we had made but a little greater distance than on a single outward march. In crossing the stream we were wet to our hips, and went to our bags in a wretched condition, having barely enough fuel to warm our tea. The weather had been so bad, that in eight days we had dry clothing but once, and our camps were now situated so that we were obliged to ford streams and wet our clothing anew just at the end of each march. The temperature of the river was 33° (0.6° C.).

On the evening of July 8th we left the sleeping-bag but little refreshed by our sleep, which had been frequently broken by our cold and comfortless condition. We took but a portion of the food, and started on without waiting for tea, eating as we went. Travelled in a straight line for the head of Black Rock Vale, in doing which two new lakes were discovered by us, both of considerable size, with much ice in the centre.

After five hours' travelling we reached a broad sloping valley, well covered with vegetation, through which a small brook of gentle gradient drained into Black Rock Vale. Fuel being found, we stopped for tea. While at this camp we endeavored, without success, to catch a half-fledged duckling, whose mother could not be seen, and observed a large burgomaster gull flying toward Lake Hazen.

The broad valley, as we travelled on, narrowed into a small ravine with such precipitous sides and rocky bottom that we

could scarcely travel through it. This cañon was a short one, and led us into Black Rock Vale at a point just above camp No. 2, which was reached after ten hours' wearisome travel.

Just before reaching this camp a number of places were passed which evidently had served as sites for summer encampments for the Eskimos. We were in too exhausted a condition to make more than a cursory examination, but I noted that there were about a dozen circles along our immediate route.

After three hours' rest, without sleep, in our bag at camp No. 17, we decided to start for the depot in Basil Norris Bay, as the weather became very threatening. On leaving, we abandoned sleeping-bag, beef, hard bread, and hatchet, placing them in a cairn. When we reached the centre of Lake Heintzelman, camp No. 1, we were so worn out that we were obliged to stop and lunch on the stores there deposited. My journal says: "Our feet are in very bad condition, as our boots are almost in pieces. Each sharp stone bruises and hurts my feet. Lynn's have been in a similar condition for several days, and he has suffered much more than I from this cause. One of his boots has only a part of the inner sole left, and he has to choose his ground carefully. His ankles are very badly chafed, and I am certain that every step for several days must have caused him pain. He has never complained, nor even intimated that he was tired and would like to camp early. His cheerful spirit and endurance are extraordinary."

During this march a violent dust-storm drove us to shelter under a high bank. The wind was from the southeast and of a most violent character, and blew in such gusts that at times we could make no headway against it. A good lunch refreshed us, but, in order to reach Discovery Bay, we dropped everything except our Eskimo relics and scientific instruments. As we neared the junction of our valley and the Bellows, the wind,

which had lulled, recommenced blowing in a violent manner, and the previously high temperature gave place to a falling one.

We reached the mouth of Black Rock Vale in eight hours' travelling, but were disappointed to find the river so high and the current so swift as to be apparently impassable. There was cached at that point certain Eskimo relics and other articles, from which it was evident to us that Salor and Whisler had been compelled to retrace their steps up the valley and pass around Lake Heintzelman, a detour of fifteen miles.

The stream seemed so dangerous that I concluded to try the Bellows, and see if that river could be forded a mile or two up the valley. If so, we could take a straight line for Conger across the mountains, by way of Lake Alexandra. We left everything but my sextant and a lunch, and started up the Bellows; but, after an hour's travel, the river was yet so broad and deep, with a muddy bottom, as to render its crossing dangerous. We then returned to the river in Black Rock Vale. On reaching its banks we were utterly exhausted by our long march, as we had travelled continuously twenty-one out of the preceding twenty-four hours, and had slept but a few hours for three days. We were also chilled by the high southeast gale and low temperatures, and were obliged to lie down under a bit of sheltering ground, where we were protected from the wind, for ten minutes' rest, to recuperate our strength before we made the attempt to cross the roaring torrent.

Stripping off our boots and socks so as to have dry foot-gear after crossing, Lynn ventured first into the stream, and had gone but two or three paces when he plunged in up to his shoulders, and in a second more completely disappeared, overcome by the strength of the current. I ran down the bank a few yards, expecting to plunge in and rescue him, but he scrambled out, fortunately on the opposite side. He presented such

a forlorn and utterly comical appearance that I could not help laughing at him, although an instant before I had been apprehensive for his safety, and knew that a similar experience was in store for me. I ventured very carefully into the water in another place, and by extreme caution succeeded in keeping my feet until I reached a point where Lynn was able to give me a hand and help me out. I was soaked to my breast, and had been obliged to hold my chronometer and field-book above my head to insure their safety.

We stopped long enough to put on our socks, and started at our best gait for the depot. The wind was blowing some thirty miles an hour, and the temperature was about 33° (0.6° C.), just above the freezing-point. I was so chilled and benumbed that I had to resort to running to keep life in me, but I found myself too exhausted to continue it. I then tried running slowly for a hundred paces, alternating by walking an equal distance. A mile of this experience reduced me to a slow, feeble walk. Lynn was so exhausted and worn out that I feared he might fall by the way, as he had to stop and sit down every hundred yards. I kept on at my best gait to reach the depot, so as to have sleeping-bag and warm drink ready for him on his arrival, or to bring it to him if he should fail.

I reached the depot at 11 P.M., of July 9th, after twenty-seven hours' travelling, so exhausted that I was scarcely able to stand. In five minutes' time, however, the alcohol-lamp was heating a pot of water, and near it stood butter, baked beans, hard bread, with coffee and milk, ready for the boiling water. I dragged out the sleeping-bag, and, putting it near the lamp, went out to watch for Lynn, who was coming along slowly. Learning that he was yet able to walk, I stripped off my wet clothing, and when he arrived, a quarter of an hour later, I was in the bag, with a hot supper ready for him.

On July 10th we started for Fort Conger, the weather being cloudy, cold, and raw, with a northwest wind. To our dismay Basil Norris Bay was entirely open, and we were very uneasy until two hours' travelling brought us to a point where we were able to cross on the floe-ice directly to French Cape, wading through many water-pools on the way. From that point to Musk-ox Bay we followed the shore or ice-foot as opportunity offered. The rotten ice frequently broke, and the muddy shore, lined with stranded ice, afforded the worst of travel. Our lower extremities were soon wet, and a drizzling rain saturated the rest of our clothing. On arriving at Musk-ox Bay we found it open, and, to avoid a long detour inward, struck out on the harbor-floe, which we found to be in a wretchedly rotten and unsafe condition. We were obliged to travel nearly half way to Bellot Island before we rounded the bay, and frequently were forced to wade through ice-cold water to the depth of our thighs, and cross many unsafe floes. With great difficulty, and after encountering serious perils, we reached the northeast point of Musk-ox Bay, where snow-squalls and bad weather rendered our travel uncomfortable until our arrival at Conger.

The outward journey entailed one hundred and eighty-two miles' travel, and the homeward ten miles less—an aggregate of three hundred and fifty-two miles in nineteen marches. This average of seventeen and a half miles to a march may seem small to those who have vague ideas as to the rough, rugged character of the country over which we journeyed.

Though Sergeant Lynn was a man of fine physique and iron endurance, yet my journal shows we were in such an exhausted condition on our return that it was many days before either of us could do active work. Lynn's feet were greatly swollen and badly bruised, and his ankles were so deeply galled that it was a month before the sores healed. He afterward acknowledged

that his feet had pained him excessively during the last three days of our trip. My own sufferings came later, for, two days after our return, when I expected to be quite well, my feet swelled, and the muscles of the ankles and feet became stiff, tense, and sore, and remained so for many days.

This July journey was a continuation of my explorations in April, and the results were:

1. The satisfactory, if not complete, determination of the extent of North Grinnell Land.
2. The outlining of the extraordinary and previously unsuspected physical conditions of the interior of that country.
3. The discovery of numerous valleys covered with comparatively luxuriant vegetation, which afford sufficient pasturage for large numbers of musk-oxen.

The area of newly discovered land which fell under my observation was not far from five thousand square miles, of which over one-half was determined with sufficient accuracy to enable me to pass positively on its physical geography. This area closely coincides with that of the entire land discoveries of the British expedition of 1875-76.

The question of the physical geography of the interior of Grinnell Land was set at rest, and, inferentially, in connection with Nordenskjöld's discoveries, that of Greenland. My discoveries accord closely, though not entirely, with the very acute opinions advanced by Sir Joseph Hooker. The intimate relations between the physical sciences is forcibly illustrated by this ability of a highly trained and accomplished specialist to state from a handful of plants the insularity or continental configuration of a land and its physical condition.

Hooker, in treating of the flora of Grinnell Land, said in 1877: "These facts seem to indicate that vegetation may be more abundant in the interior of Greenland than is supposed,

and that the glacier-bound coast-ranges of that country may protect a comparatively fertile interior. . . . We are almost driven to conclude that Grinnell Land, as well as Greenland, are, instead of ice-capped, merely ice-girt islands."

Nordenskjöld also believed that comparatively fertile valleys might be found in the interior of Greenland, and sought for them nearly seven hundred miles south of the point where I discovered them in Grinnell Land.

His failure to find such resulted from the unexpected orographical features of the country, the surface resembling an inverted saucer, a nearly level top with a very gradual slope to the sides. The whole ice-cap question turns on this point, which explains the reason the borders of Grinnell Land and its fertile belt are free from inland ice: this fertile belt, one hundred and fifty miles long and forty wide, extends from Robeson and Kennedy Channels to Greely Fiord and the western Polar Ocean. Its iceless condition depends entirely on its physical configurations. The abrupt, broken character of the country makes it impossible for the winter's scanty snow to cover it. Long, narrow, and numerous valleys not only offer the greatest amount of bare soil at favorable angles to the heating rays of the constant summer sun, but also serve as natural beds, with steep gradients, for the torrents from melting snows. The summer rivers drain rapidly the surplus water, and long before autumn and sharply freezing weather come, the land is generally free from snow, and the large rivers have dwindled to brooks. The deep intersecting fiords not only receive the discharging rivers, but, from their frozen surfaces, furnish large quantities of saline efflorescence, which mixing with the land-snow facilitates greatly its disappearance in the coming spring.

Where such conditions, as above enumerated, do not prevail in Grinnell Land, ice-caps are found similar to the inland ice of

Greenland, traversed by Nordenskiöld. The Garfield Range cutting off the snows of the United States Mountains from draining into Lake Hazen, an ice-cap exists there probably not far from three thousand miles in area. There is but little doubt the Challenger Mountains bound this ice-cap to the northwest, and that its northern face drains through Clements Markham Inlet and the many ravines which Aldrich speaks of as running far inland from the bays on the shores of the Polar Sea.

Similarly the *mer de glace* Agassiz covers the country to the westward of the Victoria and Albert Range, and its northern limit coincides with the commencement of a country where favoring valleys and fiords drain its melting ice. I have no doubt this southern glacial ice-cap covers many thousand square miles, and that its offshoots, besides the glaciers of Rawlings, Dobbin, Allman, and Franklin Pierce Bays, are to be found at the head of every considerable brook, or its connecting valley, in Kennedy Channel, Kane Sea, and Hayes Sound.

Similar physical conditions must govern the distribution of the inland ice in Greenland, and I doubt not that from Thank God Harbor one can travel eastward to St. George Fiord, and probably thence, through inlets and connecting valleys, over the coast of Greenland to the east coast. Such a trip I had planned, but was obliged to abandon it for want of dogs. The absence of any coast-glaciers north of Petermann Fiord, the extreme inland extension of Victoria, Nares, Sherard Osborn, and other inlets, as well as the comparative freedom of the bordering coasts from snow are all significant facts.

The actual determination of the northern edge of the inland ice of Greenland would have been a valuable contribution to Arctic geography, which would have fittingly supplemented the discovery of such extraordinary physical conditions as resulted from our summer explorations in Grinnell Land.

CHAPTER XXIV.

LAUNCH TRIPS, ETC.

DURING my absence in the interior affairs had passed quietly at the home station. The hunters had assiduously kept the field, but the scarcity of large game, and the shyness of the birds, made it profitable only as exercise and employment. Unfortunately the hot days of June spoiled a large quantity of meat, which became fly-blown, although carefully watched. A future party, by all means, should excavate a cellar for game, whenever the amount on hand is considerable.

On July 12th winter again threatened, for thin ice formed in places over the harbor in early morning and late evening. Although the sun was yet above the horizon at midnight, the temperature fell to 29° (-1.7° C.), a very low reading so near midsummer. The weather moderated, and a genuine rain came three days later.

On July 6th Schneider shot a Sabine gull, a rare bird, the first of the species at Conger, and probably the most northern specimen ever obtained. It was in company with long-tailed skuas, while the examples seen by Bessels were with the tern.

Near the end of the month a hunting party, under Sergeant Brainard, visited Cape Beechy. They killed eight musk-oxen, twenty-four geese, and two goslings. The geese were moulting in Beechy Lake, and the hunters found it necessary to strip and swim to the central ice to secure their game.

Whisler and Henry, at the same time, were sent across country

to bring from Black Rock Vale the Eskimo relics cached by me. Passing to the westward of Lake Alexandra, they discovered, some distance beyond, a lake one-half, and a second one-third, the size of Lake Alexandra, into which they drained, thus forming a chain. In the two lakes nearest the sea, fish were seen, the largest about four inches long. A fourth lake exists near the Bellows, and drains into that valley. They shot during their absence two musk-oxen and a hare. As no officer cared to make the trip, Sergeant Brainard was sent with the jolly boat to Basil Norris Bay for this meat. Unfortunately one animal had spoiled, but the other, with two shot by Brainard's party, was brought in.

These cattle, with one killed near the station by Jens, averaged three hundred and seventy-seven pounds dressed, a contrast to sixteen weighed in June, which averaged but little over two hundred pounds.

On July 20th Dr. Pavy's contract as surgeon of the expedition was renewed, the conditions being slightly changed in his interest, and at his request. The oath was formally administered, and the contract witnessed by Lieutenant Lockwood.

The ice had commenced to break up on July 9th, on which day the harbor partly cleared, and later the water increased rapidly in Hall Basin. Private Ellis, on July 22d, positively claimed that he saw a walrus off Distant Cape, which indicated much open water southward, and augured well for the coming of the visiting steamer. The storm of July 28th, during which the wind reached forty-eight miles an hour from the southeast, broke up much of the ice in the straits, and left open water south of a line drawn from Cape Murchison to Petermann Fiord.

Discovery Harbor was unusually clear of ice the last half of July, and boating was much indulged in. Schneider saw, July 29th, near the station, a small fish, resembling a salmon, which

may have come down from Lake Alexandra. A few days later I saw two minnows, about an inch long, in the harbor.

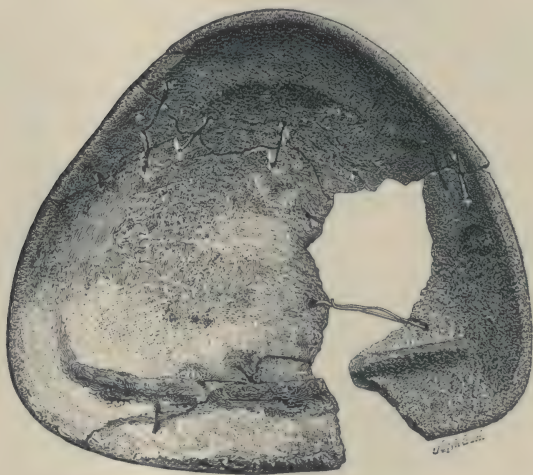
The conditions in Hall's basin remaining favorable, I decided to run the launch southward around Cape Lieber, to determine the state of the ice in Kennedy Channel, and with the hope of seeing to the southward the visiting steamer, which all expected daily. We left August 7th, at 10 A.M., and two hours and a half later landed Lieutenant Kislingbury, Sergeants Brainard and Israel, who were to explore the vicinity of Cape Baird during our absence.

As the tide had commenced setting some light ice southward, I did not care to venture too far, and so landed, about 3 P.M., just north of Cape Craycroft. Here I cached a barrel of bread and a hundred pounds of meat, which I had brought out to supplement the small stores at Cape Baird, in case of delay.

From an elevation of about two hundred feet Kennedy Channel was carefully examined with a glass. Cape Constitution and the eastern half of Franklin Island could be plainly seen, but no ice, except a rare and occasional floeberg. It was evident that Kennedy Channel was freer from ice than in August, 1881. Doubts were expressed as to whether a ship had been sent, for it seemed certain that she would have run up during the southwesterly gales. During an hour's stay the men occupied their spare time in obtaining fossils, the presence of which had been detected by Sergeant Gardiner. This place was again visited, and the report of Sergeant Gardiner on fossils forms an appendix. Sergeant Brainard also found later many fossils and a petrified forest near Cape Baird.

On our return, the eastern entrance of Discovery Harbor was found to be packed with ice, and, running in to the westward of Bellot Island, we reached shore near Proteus Point with great trouble.

The party at Cape Baird had examined the country thoroughly. The only land-game was a dirty yellowish-white fox, which had also been seen from the launch. Sergeant Brainard, who seemed intuitively to locate such places, discovered the sites of eighteen Eskimo summer tents, and gathered near them a large number of relics. The circles varied from five to fifteen feet in diameter. There were two upstanders, runners, bone



Eskimo Stone Lamp, Found near Cape Baird, 81° 30' N:

[From a photograph.]

shoes, cross-bars, etc., making a complete sledge; a very large stone (steatite probably) lamp, fifteen inches across, was broken in five pieces, and had been still used fastened together by seal thongs. There was also a bone spear-head, and other relics of like material, the use of which was unknown to our Danish Eskimo.

Our trip to Cape Craycroft was a disappointing one, in that it

gave no tidings of the relief steamer. The causes which delayed her are plain from the report of Mr. Beebe, which shows too conclusively a misapprehension of the situation. From Beebe's statements it appears that the Neptune remained about nine days in Pandora Harbor, the time being partly spent in hunting. "During our stay there of a week," he says, "riding out a succession of *southwesterly gales*, much trouble was experienced, our anchor being lost, etc. . . . On August 7th the water-casks were filled, and we resumed our way northward."

It is well known that strong *southwesterly* winds insure the most favorable conditions (indeed, during a bad ice-year the only conditions) under which Smith Sound and Kane Sea can be navigated. Since the Neptune spent her time in a retired harbor, losing her anchors under a wind which undoubtedly cleared from ice the whole west side of Kane Sea, we can now easily understand why she failed to reach Conger in 1882.

I had still some hopes of the ship, but, as Archer Fiord was open, I felt obliged to send the launch Lady Greely, under Lieutenant Lockwood, to examine the head of the fiord, with a view to future exploration in that direction. He left on August 13th, with orders to be absent not exceeding three days. He followed the southern shore outward, in order to obtain game. "The north shore," he says, "is at the foot of a continuous line of steep cliffs, while the southern is a glassy slope rising gradually to the hills some miles back. In places, however, these hills approach the shore, and here and there the mountain streams have formed great gaps and declivities. . . . Ella Bay is walled in on both sides by steep and high cliffs, which, extending inland, form a valley."

Unfortunately, at the head of Ella Bay the launch was run upon a large shoal at high tide, and was left high and dry.

This gave Lieutenant Lockwood great uneasiness, and he was unable to absent himself from the launch more than two or three hours. As soon as the launch could be got off he was obliged to return, which was done without farther mishap. During the trip a large amount of game was obtained, comprising twelve musk-oxen, weighing twenty-four hundred pounds; twenty-four geese, three hares, twenty ptarmigans, and forty-five smaller birds. In the waters at the head of Ella Bay there were many large yellow jelly-fish, one of which, over six inches in diameter, was brought to the station.

A large bone, apparently of a Greenland whale, was discovered at the head, and a very large piece of driftwood at the south shore, of the bay. The bone was three and a half feet in length, a foot in diameter, was partly petrified and weighed eighty-five pounds. A small glacier was noticed in Beatrix Bay, and two others on the south side of Archer Fiord. Traces of summer encampments of Eskimo were observed here and there on the shores of Ella Bay. A visit to Hillock Depot proved that the provisions cached in bags by Lieutenant Archer, R.N., had been eaten by foxes or wolves.

About thirty more head of musk-oxen were seen on the south side of the fiord, but they were not disturbed, on account of the quantity of meat already on board and the uncertainty of our coal lasting for the return journey.

Sergeant Brainard, who had charge of the fresh meat, records that up to this date fifty-two musk-oxen had been obtained in 1882, averaging two hundred and forty-three pounds each of dressed meat.

Private Long, on August 12th, distinguished himself as a hunter. My journal of the following day says:

“Long returned at 6 P.M., having been gone twenty-two hours hunting. His prolonged absence caused much alarm, as

he was alone. Several parties had been sent out to search for him, when he was met returning. He had fallen in with a herd of musk-oxen in the valley, about two miles above the head of St. Patrick Bay. He had sixteen rounds of ammunition at starting, and, shortly after, fired two at an owl. With the remaining ammunition he killed eight musk-oxen, and wounded two others; four escaped. He had delayed to skin the eight before returning to the station, in order that the meat should not taint. He saw three large falcons (*Falco candicans*), the first that have been observed by us."

Long's record as a hunter had always been a fine one, but this success first particularly called my attention to his extraordinary qualities in that direction. He never afterward, even under most critical circumstances, failed to show the same patience, coolness, and skill as on this occasion.

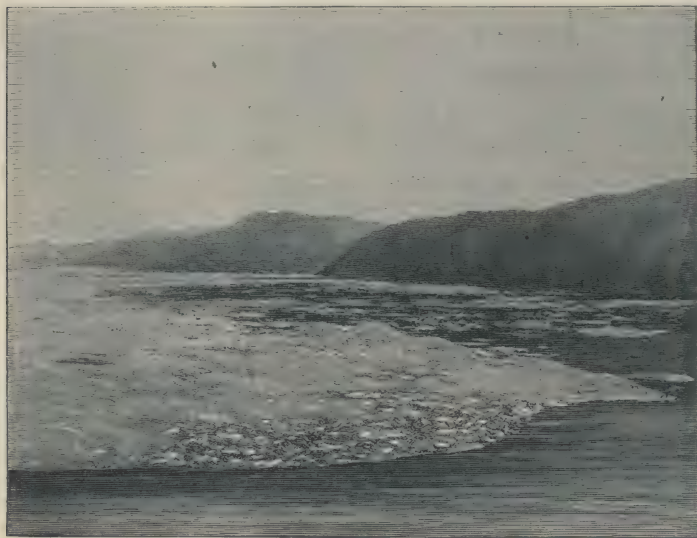
My journal says:

"August 14th.—Lieutenant Kislingbury, having volunteered for the work, left, with the Valorous, to obtain the meat at the head of St. Patrick Bay, intending to pass around Distant Cape to Cape Murchison by boat, but he was obliged to return, owing to the ice crowded against the shore between Dutch Island and Distant Cape. He left again at noon, with four men, to put the meat on tripods off the ground, where it will be safe until it can be brought in by sledge."

"August 15th.—Lieutenant Kislingbury and party came back this afternoon, having remained over night in St. Patrick Valley. The meat is securely cached—hung on poles in stone huts which they constructed. The three cattle lately killed by Brainard and Cross were visited, and are in good condition. Falcons were seen, but not near enough for a shot to be obtained."

On August 19th Lieutenant Lockwood was ordered, with the launch, to Ida Bay, the southwestern point of Chandler Fiord,

leaving en route Dr. Pavy and Sergeant Elison at Cape Baird, whence they were to visit Carl Ritter Bay on foot, in the hope that some signs of a ship might be noted. The trip was made without serious difficulty, until densely packed ice was fallen in with in Chandler Fiord some miles to the westward of Miller Island. The launch reached with difficulty a point within a mile of the northern extension of the fiord.



Chandler Fiord looking Westward, Ida Bay to Extreme Left.

[From a photograph.]

Sergeant Israel, our astronomer, landed at several places, and made sufficiently extended astronomical and trigonometrical observations to accurately determine the configuration of the southern part of the fiord. A small, rocky islet was discovered just to the west of Miller Island, which in April had seemed to me to be a prolongation of the latter island. Several photographs were taken, and two musk-oxen were obtained.

In a ravine on the southern side of Chandler Fiord were

found many stone caches, evidently the work of Eskimo, and a number of bone implements, which proved the occasional visits of these folk in former ages.

Other extracts from my journal show the important incidents of the autumn of 1882.

“August 22d.—With Sergeant Brainard I visited the coal-mine in Watercourse Ravine, and obtained a large number of fine fossils. Returning by the way of Distant Cape, we saw a musk-ox, which was killed by Brainard. The straits are solid above Cape Murchison, and from that point, as far below Cape Lieber as can be seen, everything is open and clear. I sent Jens and Connell to Lake Alexandra to visit the nets. They brought back a fine salmon, which weighed four and three-fourths pounds and was eighteen inches long. A net had been set, and also thirty hooks, but this was the only fish obtained so far.”

There were many fish in Lake Alexandra, but the meshes of the net were unfortunately too large to catch them. On the 17th Dr. Pavy saw a fish resembling the sculpin near the tide-gauge—the first seen of that variety. A few days later fish of the same character, which were from two to six inches in length, were observed near the head of St. Patrick Bay. These latter were seen by Sergeant Brainard, who was sent, with five men, to bring to the station the whale-boat cached the preceding year at Depot “B” near Cape Beechy.

“August 25th.—Artificial light will soon be needed. I have quite given up the ship; as, indeed, have most of the men. I hope against hope, and defer going on an allowance of our remaining stock of vegetables until September 1st. We have enough of them, but, in the matter of vegetables, we must live much more simply than the past year. The straits were unusually free from ice to-day, as was Archer Fiord. I sent Lieutenant Lockwood, at 5 P.M., with launch Lady Greely, to

Cape Baird to bring back Dr. Pavy. He adds to the depot a barrel of hard bread, a box of extract of beef, and another of roast beef, and a small quantity of coal. I regret exceedingly that Sergeant Brainard is not back, as then I could have sent the Valorous to Cape Baird and had her hauled up. As it is, with the whale-boat at Cape Beechy, I feel insecure in sending our only large boat beyond our reach. We should have had a second whale-boat, but money was lacking in 1881."

"August 27th.—Brainard arrived at midnight with the whale-boat. Considerable trouble had been experienced both from old and new ice. They reached Depot 'B' in six and one fourth hours, but were seventeen in returning.

"Lieutenant Lockwood back this morning with Dr. Pavy's party, which reached Cape Baird yesterday morning. Dr. Pavy found that the valley near Baird, down which Pavy river flows, extends to a divide which is only five miles from Cape Defosse, to which cape a second valley, broad and large, descends. Four lakes are formed by the enlargement of the river between Cape Baird and the divide. They reached Carl Ritter Bay via the coast, and found the cache there exactly as it was left over a year ago. No ice was seen in Kennedy Channel, nor as far south as they could see from an elevation of seven hundred feet at Cape Defosse. At Carl Ritter Bay the weather was foggy and disagreeable. They were fifty hours in going and returning from Baird. Dr. Pavy found some Eskimo relics at Cape Baird. Two musk-cattle, a cow and calf, were killed by Elison during the journey."

The first serious breach of discipline occurred on August 28th, in the case of my engineer, a skilled machinist, whose services were indispensable, and of whom I had expected better things. My journal says: "The engineer is drunk to-day. He fell from the launch into the water, where he would have drowned if he

had not been rescued by Brainard. He refused to obey any orders of the non-commissioned officers until I took him in hand myself. I learned from Lieutenant Lockwood that he had stolen a portion of the alcohol which was sent with the launch for fuel on the late trip up Archer Fiord, and was drunk at that time. He evidently avails himself of every opportunity to purloin and conceal a portion of the fuel alcohol sent out with parties."

Lieutenant Lockwood was ordered, on the 29th, to the head of Archer Fiord for exploration. At 7 A.M., however, the temperature fell to 31.9° (-0.1° C.), to remain permanently below the freezing-point, as it transpired, being one day earlier than in 1881; and, the weather being threatening, Lieutenant Lockwood's orders were countermanded.

On August 31st my journal says: "The harbor is completely filled with pack-ice, which opened a little this evening. The young ice is forming slowly, but it will readily cement the older floes, jammed together as they now are. I assigned Frederick to duty as engineer to run the launch. I sent it and the Valorous to-day to Dutch Island, under Lieutenant Lockwood, with instructions to have them placed in safety, so that they can be hauled up for winter quarters.

"Lieutenant Lockwood returned at 1 A.M. with the party, reporting the launch left in safe condition. I visited Dutch Island immediately after breakfast, to see exactly how the launch was situated, and my action proved very fortunate. I found she had grounded, and, having fallen seaward, her outer taffrail was about two inches under water, caused by the tide which had just commenced flowing. I ran to the station as rapidly as possible, and, obtaining a party with ropes, succeeded in righting the launch and clearing her of water, though with much difficulty. I had her moored at a safe distance from shore, and have ordered her to be visited at every low tide."

In hauling up the launch at Dutch Island, I realized the danger of so doing, for no absolutely secure berth could be found for her. It was a choice of evils, however, as I looked forward to the contingency of a possible retreat in 1883. As it happened, the launch would have been unavailable the following year, if I had secured her on the ice-foot near the station as in 1881. In 1883 Discovery Harbor never cleared of ice, a condition which is not unusual, as is evidenced by the unbroken floe through which the *Proteus* forced her way on our arrival in 1881.



The Frog.

[A Floeberg in Robeson Channel, May, 1882.]



Cape Washington.
[Lockwood's *Farthest North*, 1882.]

CHAPTER XXV.

OUR SECOND WINTER.

IT is obvious that our second winter could hardly pass as pleasantly as the first. The novelty of Arctic service had passed with all, while the unvarying routine and wearisome monotony could not but more deeply depress the spirits of the men. The non-arrival of the visiting steamer not only in itself threw a gloom over the party, but it necessitated a restriction in the use of certain articles of food, and the feeling alone of being on allowance is irksome to many men. I had carefully preserved for the second year the regulation allowance of vegetables, flour, etc., but had used of these articles the entire margin allowed for wastage and loss, as well as the surplus resulting from the return of three men the preceding year. We had, however, hard bread, salt meats, butter, pickles, milk, eggs, fruits, molasses, tea,

and coffee in abundant quantities, as well as several tons of fresh meat. Notwithstanding this ample supply of food, the surgeon not only spoke discouragingly in his official report of the prospects of health for the expedition during the coming year, but also forgot himself to the extent of sending such a communication through the hands of an enlisted man, with whom, as well as with others, he discussed the situation. The dissatisfaction, if not the disaffection, that such a course would naturally cause had also to be counteracted.

The only method to pursue was to give unusual and extraordinary attention to all matters which could affect the health and spirits of the men. To this end personal and particular observation was had daily of the dryness of the beds, the proper preparation of the food, and the regularity of life on the part of the men. The diet was enlarged, as far as practicable, by experiments with new dishes, and an order was issued forbidding sleep during the day. The heating arrangements, which had been defective during the first year, were overhauled and materially improved. A large porch was added to the building, and the external walls of snow and ice were carried to the very roof. The advice of the surgeon was invited, and all medical recommendations were scrupulously followed as far as means and duty would permit. The result of these labors was dryer, warmer, and more comfortable quarters even than we had during the preceding year. The men passed the winter in better spirits and condition, and the surgeon admitted, in an official report the next spring, that their health was better during the second than the first winter.

The experiences of the second year need not be dwelt on at length, but I extract from my diary the most important items :

“ September 2d.—Having given up the ship, I commenced

to-day, putting our scientific reports in such condition that they can be readily transported in case of necessity next year."

"September 8th.—The lower harbor is yet open, owing partly to the fact that September to date has been 3° (1.7° C.) warmer than last year. Jens and Frederik have each killed a seal (*Phoca hispida*) within the past week."

"September 9th.—Jens shot a large, snowy owl." This was one of the last birds seen that year. On the same day Long released six owls which he had raised. They had inordinate appetites, and from the time they were caught, as young owlets, swallowed anything given them. I remember one bolting whole a sandpiper about half his own size. Over a hundred and fifty skuas (robber gulls) were killed and fed to these owls. It was interesting to note that, although they had never used their wings, the owls flew well. Two of them were awkward and heavy in flight, but another flew a long distance before alighting.

"September 11th.—I ordered the slaughter of the weakest musk-calf, which was failing; he dressed only forty-two pounds."

"September 16th.—Jens caught a fine, young fox, pure white, except a few black hairs in his tail. I have decided to keep him. Biederbick shot a fox the other day, but, neglecting to load his gun at once, lost him, as the fox was playing possum. He was much chagrined to have Reynard jump up and run, on his near approach."

"September 17th.—We hauled up the launch at Dutch Island, the spring tide being very high and conditions favorable. She lies broadside on, and is in a fairly safe location. Sergeant Israel skated down to assist in hauling her up, and broke through the young ice between Dutch and Breakwater Islands, and was rescued with some difficulty. He was quickly sent back to the station by dog-sledge, and suffered no harm from the accident."

"September 21st.—Temperature was down to 0.7° (−17.4° C.)

to-day, showing the approach of winter. It fell below zero (-17.8° C.) in 1881 one day earlier."

"September 22d.—Another fox caught alive by Jens. The one first caught is now quite tame, and does not much mind being handled. When stroked he makes a purring noise, not unlike that of a cat. He invariably jumps at one's face when it is brought near to him."

"September 24th.—Psalms were read at 10 A.M., after which Lieutenant Lockwood started out on a trip of four or five days with dog-sledge. He goes at his own request, with a desire to see whether he can reach Lake Heintzelman in Black Rock Vale by sledge." He returned three days later, convinced of the general impracticability of sledging to Lake Hazen overland, as the short trip wore through a steel runner. He found the ice on Lake Heintzelman a foot thick, and had a temperature of -4° (-20° C.) on the 25th, the lowest temperature noted in September that year. A musk-ox, dressing three hundred and seventy-one pounds, was killed three miles above the lake.

On the 28th Brainard shot a large, fine raven (our first and only one) weighing four and three-fourths pounds, and the day following Jens caught an ermine already in his winter fur.

"September 30th.—A bear visited the station last night, and carried off the musk-ox skeleton from a rock within a short distance of the house, but dropped it after carrying it a hundred yards; probably alarmed by the barking of the dogs. Many tracks are to be seen, and some are of the opinion that there are two or three bears, but Sergeant Brainard, by my orders, measured the tracks, and found them all to be of equal size, seven and a half by nine inches. Lieutenant Kislingbury and five others, with dog-team, followed the track some four or five miles, but lost it on the thin, smooth ice."

"October 1st.—New ice is now a foot thick, and the temper-

ature fell below zero (-17.8° C.) for the first time. Bear-tracks were seen to-day by Long. Lieutenant Lockwood and four others, with dog-sledge, were sent out to hunt him. They were gone two hours, and returned reporting that Jens and Brainard had seen the bear, and got within five hundred yards of him." The bear came again on the 3d, and its tracks indicated the same animal, the only one known at Conger. In consequence of these visits, I required the men to obtain authority for any extended absence from the station. In connection with this affair I was obliged to reduce Sergeant Lynn to the ranks for a disrespectful remark, the only blemish on Lynn's otherwise admirable record in his three years' service.

"October 6th.—The water around Distant Cape is frozen over, but not yet safe for travel. Connell tried to bring coal around it yesterday. One of the musk-calves died three days since, and I sent the others to Bellot Island to-day on dog-sledge. We tried, first, driving them over the ice, but were unable to do so. When they reached the island and one was untied, he died immediately. The other was taken up into the ravine, following Long like a dog, but, despite all efforts, the men were unable to leave him there; he ran after the sledge and returned to the station. After arriving near the house he followed Long everywhere, and was finally carried to his old pen." He died the next day, from what cause we could not ascertain.

"Oct. 9th.—The day is a perfect one, marked by a display of those delicate and indescribable tints which are peculiar to an Arctic sky. During a greater part of the day a solar halo, very bright and beautiful, presented itself. These wonderful beauties of sky and celestial phenomena are not, however, of such frequent occurrence as many Arctic narratives would lead one to suppose."

"Oct. 13th.—Yesterday an owl and a ptarmigan were seen. It

is possible the owl is one of our own." (This owl or another was seen on the 17th). "We killed one of the foxes this morning; he repeatedly broke his chain, and has continued as vicious as when caught, biting us at every opportunity. The one first captured, named Reuben, is quite tame. It is probable that he is a young animal and the other an old one. The three sledges returned this evening, bringing in eight hundred and forty pounds of meat. Most unfortunately foxes were able to enter the stone huts constructed in St. Patrick Valley, and half the meat has been eaten. At Cape Beechy an entire musk-ox was gone, which is charged to a bear, whose tracks were seen at several places pointing south." The rest of the meat, nearly a thousand pounds, was brought in by Sergeant Rice a few days later.

"Oct. 16th.—The temperature fell yesterday (permanently) below zero (-17.8° C.), sixteen days earlier than last year. The sun left us to-day for the winter, and was last seen on the 13th."

"Oct. 22d.—Psalms were read as usual at ten o'clock. Bender is the first man who has objected to the service, and was excused to-day, at his own request, on religious grounds. It is proper and essential that there should be an observance of the day, but I have rarely commented on what was read and have endeavored to avoid anything like sectarianism in my selections, having no wish to constrain the religious opinion of any man."

"Oct. 24th.—The first occultation yet observed, occurred to-day. It was of delta piscium. Immersion 8 hours, 27 minutes and 9.10 seconds, by chronometer No. 198, which was fast of local sidereal time 4 hours, 32 minutes, 24.7 seconds."

"Oct. 27th.—Dr. Pavy, at his expressed desire, was ordered to proceed to or beyond Carl Ritter Bay, and as much farther south as is possible, to examine the coast for any caches or signs of the expected relief vessel of this year; he is accom-

panied by Brainard and Jens, with dog-sledges. Before leaving, Dr. Pavy reported the party to be in health."

"Oct. 30th.—The sky at noon is now a bright brick-red, but is daily fading in light and beauty."

"Oct. 31st.—Temperature very high, -6° (-21.1° C.)."

"November 3d.—Schneider had the fox outside the house to-day; Reuben was much alarmed at the dogs, who displayed a lively interest in him, and seemed to appeal to his master for protection, and to be very glad to return to confinement."

"Nov. 5th.—Psalms were read at 10 A.M. The temperature fell sharply last night, and is now at -30° (-34.4° C.). The sky at noon, quite clear to the south, was very bright at the horizon. Our quiet November 5th contrasts strikingly with the noisy amusements of the English at this point in 1875. Dr. Pavy and Brainard arrived this evening, leaving Cape Baird at six this morning. Dr. Pavy's private dog died during the trip. The team returns in quite an exhausted condition, the trip having evidently been a very severe one for them. The party travelled only as far as Carl Ritter Bay. Going overland from Cape Baird, they struck the coast at Cape Defosse, and when five miles south of that cape, while travelling over the new ice, the sledge broke through. The travelling was fair along the coast, though the ice was in motion, being moved by the tides up and down Kennedy Channel, which was evidently open. Southeast of Carl Ritter Bay water-clouds were seen for some distance, but to the south there was an ice-blink. A hare was seen on October 28th, a musk-ox killed on November 1st, and another was seen a few days before, near Cape Defosse. In pursuit of the former Brainard discovered on a low bench a circle of stones, ten feet in diameter, indicating the site of an ancient Eskimo encampment. Snow covering the ground prevented him from farther examining the place. The divide of Judge Daly Peninsula between

the head of Pavy River and Defosse Valley is but four hundred and twenty feet above the sea by barometrical measurement."

"Nov. 20th.—Jens trapped a fox yesterday, and to-day he wounded a seal (*Phoca hispida*), which has been seen several times in the tide-hole by Rice." The day following Jens shot the seal, which proved to be a baby, weighing only twenty pounds.

"Nov. 24th.—The men are meeting the winter much more cheerfully than last year, and have much better appetite. I lectured this evening on the aurora. Israel, at 9 P.M., tested the light of the full moon by a grease-spot photometer; it was found to equal the light of an adamantine candle at a distance of forty-nine and a half inches. At 10 P.M. the thermometers in the inner shelter were observed by it, and diamond print was read with ease. It seems to me that I have never known it to give so much light before."

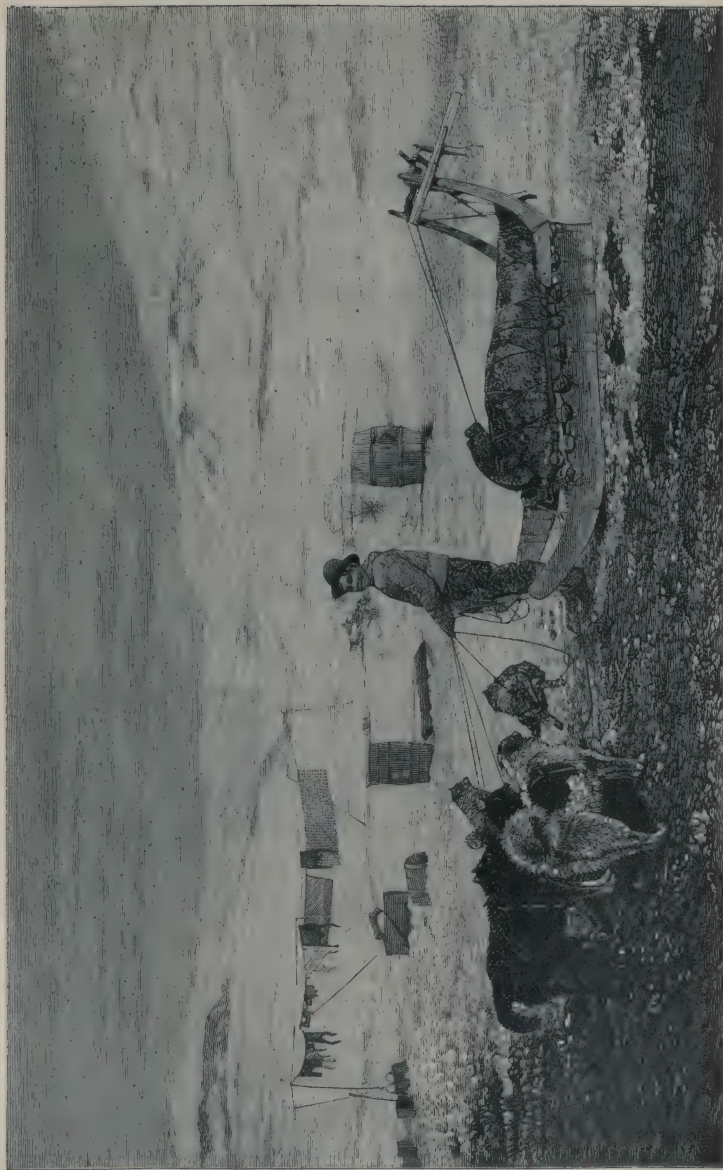
"Nov. 25th.—At 11.50 A.M. a bright red meteor was observed, which at first appeared due north, at an elevation of 10°. It burst just above the horizon; no detonation was heard, nor trail seen; time of flight about ten seconds."

"Nov. 26th.—Fresh hare-tracks were seen near Proteus Point. He must be having hard times during this Arctic night with its extreme cold."

November 30th was celebrated as Thanksgiving Day, which was appointed by the following order:

"Thursday, November 30, 1882, being without doubt the appointed day of national thanksgiving, is herewith designated as a day of thanksgiving and praise. Exemption from death and disease, success in scientific and geographical work, together with the present possession of health and cheerfulness, may be mentioned as special mercies for which this command has reason to be devoutly thankful."

Target-shooting for prizes and an excellent dinner were the



ESKIMO JENS RETURNING FROM SEAL HUNT.

(From a photograph.)

features of the day. The shooting was done by moonlight at fifty yards' distance.

On December 3d a wolf was heard near the station, and at Dutch Island on the 9th, while ermine-tracks were seen on the 5th. It is evident these animals are not migratory.

"Dec. 4th.—The men so far have shown no gloom or despondency, and are pictures of health. Sergeant Brainard, the orderly-sergeant, exercises his ingenuity to moderately exercise those disinclined to walk."

"Dec. 8th.—We have had a bit of the Greenland *foehn*. The barometer rose a quarter of an inch during the day. About 10 A.M. slight puffs came from the south; much wind to the southwest an hour later, followed by strong occasional puffs. At 12 M. it was found that the temperature had risen 13° (7.2° C.) in the hour."

"December 11th.—Lieutenant Lockwood had an unfortunate experience with one of the dogs to-day. He left the lantern and original record near the temperature-shelter while he went to make his magnetic observations. On his return he found that the dog, attracted perhaps by the odor of grease about the cover, had bitten out a third part of many pages, and apparently swallowed the paper. One of the dogs, a short time since, grabbed a large dish-rag that was thrown out with the water, and bolted it at once."

"December 12th.—The tame fox, Reuben, so long an inmate of the lean-to, concluded to leave, and so has dug himself a hole in the snow-wall which surrounds the house. He shows his nose occasionally, but is evidently unwilling to return. The dogs discovered him in the snow-wall and have been digging for him. He has become tame and allows handling, though reluctantly, without any attempt at biting unless provoked. He has amused himself for a long time by caching supplies of extra

meat. He was out once near the dogs, and a one-month puppy coming up, the fox caught him by the nose and sent him away yelping. He seemed lately to have but little fear of the dogs."

"December 15th.—Dr. Pavy delivered an interesting lecture on Napoleon."

"December 22d.—The electrical self-registering tide-gauge commenced working this afternoon, recording every five inches' rise of the tide. We lost an occultation this evening through cloudiness. We have been very unfortunate in that respect. This was a three-and-a-half-magnitude star, and was visible ten minutes before its occultating time. Brainard and Whisler visited Cairn Hill to expose a maximum thermometer. Hare-tracks were seen on the hill and an ermine-track near the station. It was quite calm at the station, but the wind was blowing fourteen miles an hour on the hill."

"December 31st.—The temperature is again below -30° (-34° C.), with calm weather, which makes it very comfortable. Psalms read and inspection as usual. The beds were all dry and everyone in good health. Over a pound of fresh meat has been eaten daily during December, and since October 1st the consumption has averaged a pound and a tenth daily."

"January 1st.—The men watched the Old Year out and the New Year in. Schneider placed on the game rack, where it was visible to everyone leaving the house, an illuminated placard wishing everybody a 'Happy New Year.' A small quantity of rum, two ounces to a man, was issued this evening."

"Jan. 4th.—One of my curtains was set on fire by Henry's carelessness to-day. Fortunately Lieutenant Lockwood pulled them down and prevented any serious damage."

"Jan. 5th.—The southern sky, at noon, was free from clouds, and presented to our view a creamy yellowish tint which was mixed with a mere suspicion of crimson. The appetites of the

few men who had in a measure lost them have commenced to improve. Biederbick has a faint touch of rheumatism. I caught the fox this evening, but did not stroke him, as I was without gloves and he was much excited over his new imprisonment."

"Jan. 7th.—Read Psalms at 9 A.M. Ordered Cross to examine the launch to-day, as the ice changed somewhat during the last storm. The stern-post was found somewhat injured by the last heavy tide, which had forced the ice-foot against her." It was impossible to do anything but occasionally cut out the ice pushed up around her, which was done regularly. The injury proved unimportant, and was easily repaired the following spring.

"Jan. 11th.—We have the new moon again, which contributes in no small degree to the brightness of our days. The dark season is at an end, although occasional cloudy days may necessarily be darker than to-day. The doctor prescribes an extra allowance of fresh meat for Biederbick and Jens. The former has rheumatism, and the latter seems well, but has a small appetite. This is the only special diet the doctor has yet prescribed. I read a number of extracts, mainly poetical, to the men this evening. Yesterday our last lamp-chimney broke, and we resort now to broken stubs, bottles, etc."

"Jan. 12th.—Ermine and fox tracks seen to-day on Cairn Hill, proving that these animals do not hibernate."

"Jan. 15th.—Temperature -50° (-45.6° C.), the lowest of the winter to date."

"January 20th.—Cross' thirty-ninth birthday, which was celebrated as usual, though he himself refrained from drinking any spirituous liquors, a reform which I trust he will continue. The harbor-floe is fifty-one inches thick."

"25th.—Brainard and Christiansen visited Cairn Hill to read the thermometers. The tracks of several ermine, a fox, and hare were observed. A few days since a place was seen where

a hare had dug through the snow to the ground, evidently for food. The Greenland coast was quite plainly visible, particularly in the neighborhood of Polaris Promontory."

"February 1st.—On the surgeon's recommendation, a small quantity of extra fresh meat is now issued daily to Long."

"Feb. 7th.—The distance which the harbor-ice has moved since we commenced reading tide-gauge No. 6 was measured to-day. The direct distance has been twelve and one-half feet, but, calculated as irregularly crossed, it must have moved twenty feet. The resultant direction is toward the south-southwest, *i.e.*, off shore. But few stars, and those of the first and second magnitude, could be seen at noon to-day."

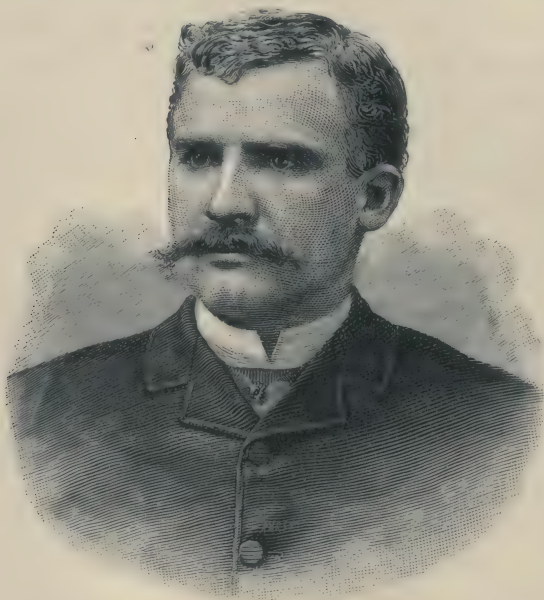
"Feb. 8th.—The thermometers in the instrument-shelter were read for three hours without light to-day. From 10 A.M. to noon the spirit thermometer indicated temperatures from 0.6° to 0.8° above freezing mercury, but the mercurial thermometer remained frozen. It thawed out only at 2 P.M., having been frozen eight days and three hours. It is quite a coincidence that the lowest spell of frozen mercury commenced on the same day, January 31, in 1882 and 1883. The lowest temperatures of the two winters have been upon the same day, February 4th."

"Feb. 9th.—Millitook's puppy met with a misfortune this morning. Frederik brought him in gasping and nearly dead; his tail was frozen as stiff as a poker, and even meat could not tempt him. When an Eskimo dog cannot eat he is in a bad way. His tail was thawed out in cold water and he finally recovered. The puppy has been wandering around alone at these very low temperatures, and it is a surprise to me that he has not died. The men have named him General Grant for his persistency. Christiansen killed a hare. Barometer touched 29.109 to-day."

"Feb. 11th.—The ice is substantially stationary in freezing,

having increased but three-fourths of an inch in the past ten days, being now fifty-three inches thick. Long is fit for duty, but still has meat diet; it has also been ordered for Bender."

"Feb. 12th.—Connell chained and staked out two miles on the road toward Cape Beechy. The second mile-stake is about three hundred yards beyond Dutch Island. Lieutenant Lock-



Private Maurice Connell.

wood, with Christiansen, took a load of provisions toward Cape Baird. The dogs made the two miles in returning, without load, in twenty minutes. The second mile-stake, a distance slightly over two miles from the house, was reached in going out, with load, in twenty-four minutes."

"Feb. 19th.—Connell visited Cairn Hill to read the instruments. It seemed from the hill as though a storm must be pre-

vailing to the northeast ; the barometer is remarkably low, but steady. It has not been above 29.06 to-day, and touched, at 1 P.M., 28.968—the lowest yet recorded by us. It was read every half hour so as to catch the lowest point. The temperature rose slowly from -39° (-39.4° C.) to -26° (-32.2° C.), but no wind was experienced. The southwest window in the men's room was opened to-day at their request."

"Feb. 22d.—It being Washington's Birthday, all work, except that absolutely necessary, was suspended, and a small quantity of rum issued in the evening."

"Feb. 25th.—I read Psalms as usual. The sun should have risen, astronomically, to-day, or at least the upper limb of it, but it was not visible."

"March 1st.—The first day of spring brings a sense of relief that the second winter is over, and that the entire party is in perfect health. The unfavorable experiences of other expeditions, the forebodings of my surgeon, and the knowledge that no party had ever passed a second winter in such high latitudes, all combined, caused me much uneasiness, which has been a great mental trial during the past winter. Perfect ease of mind cannot come until a ship is again seen. Spring sledging on the Greenland side is looked forward to with some dread, and I shall feel insecure until Lieutenant Lockwood and his party are again safe on the Grinnell Land coast."

The second winter had now passed, and spring found us with health and spirits unimpaired. The three men, who for a few days had been allowed a special amount of fresh meat, speedily returned to their normal diet. With the coming sun all looked forward to a brief period of spring sledging, to be followed, as we hoped, by a relieving vessel ; or, as we feared, by a retreat southward with our boats.

CHAPTER XXVI.

NORTHWARD AGAIN.

WITH the spring open and the sun returned, hunting was commenced with great energy, but with scanty results. Lieutenant Kislingbury succeeded, on March 3d, in shooting an ermine in his snowy suit, who had wintered in the commissary pile, and six days later shot a fine hare, which weighed nearly eleven pounds.

The main spring work was to be a renewal of explorations in North Greenland, and with that view every attention had been paid to our dogs and their condition. A number of the dogs were shot, as they were too old for work and our supply of dog-food limited. My journal says: "We are now better off for dogs than on our arrival; having twenty which can be depended on for long sledge journeys, and nine others which are fit for short trips. Our dogs have been fed regularly every other day, and, in addition, have been given daily the leavings of the table. The Polaris people, according to the report, fed theirs only twice a week. It is not to be wondered that they were savage and wolfish. Our dogs have not been as well fed as I could desire, as I have no food this winter but pork, beef, and fish (all salt). Their food has always been thoroughly soaked and freshened, and, what I consider an important point, always fed to them in an unfrozen and generally warm condition. Hard bread has been given to as many as would eat it, which includes the puppies raised here and one or two of the

old dogs. Most of the Greenland dogs will not touch bread, even when very hungry. Of the fifteen puppies born in Grinnell Land, which are now fit for work, five were from one bitch and seven from another. There is a great difference in the manner in which the bitches care for their young."

Lieutenant Lockwood left for his preliminary journey on March 10th, and was absent seven days. He was accompanied by Sergeants Brainard, Jewell, and Elison, and the two Eskimo, with their dog-teams. He succeeded in laying out a practicable sledge route from Cape Beechy to Cape Sumner, and in accumulating near the latter point about thirteen hundred pounds of field supplies. This preliminary work was performed in the most satisfactory manner, and without accident or suffering apart from the great discomforts that are necessarily experienced in sledging in very low temperatures.

Sergeant Elison, however, was taken sick the first day out, but, feeling better the next morning he continued on until the 13th. Lieutenant Lockwood then sent him back by sledge to Depot "B," near Cape Beechy, from which point, as he had recovered strength, he persuaded Sergeant Jewell to permit him to return on foot to Fort Conger. The pluck, endurance, and courage displayed by Elison on this occasion were only in keeping with the manner in which he performed all field service in connection with the expedition.

Sergeant Jewell remained in the field one day after Lieutenant Lockwood's return to perform certain field work. An accident occurred to his party at Depot "B," which delayed his return several hours, and might, under other circumstances, have proved a very serious matter. Instead of securing the dog-harness and whip in their own tent, they placed them in the depot. During the night the dogs broke in, stole and ate the harness and whip, which fortunately could be replaced from leather

cached at that point. The absolute safety of anything which a dog can eat is to be secured in the field only by keeping it under one's head or body.

Lieutenant Lockwood started on his final journey March 27th. His principal instructions read: "Except from unforeseen delays, you will be at Polaris Boat Camp not later than May 31st. Should any of the following contingencies arise, you will return immediately to this station: if you at any time think you cannot go beyond your farthest of 1882; if the polar pack shows signs of disintegration; if you are personally incapacitated for rapid travel; if any member of your party is badly injured. . . . The dangers attendant on your trip are obvious and serious. While reposing great confidence in your judgment and discretion, I cannot refrain from cautioning you against more risks than can possibly be avoided." Other clauses provided for further contingencies, and informed him what aid he could expect from the station in case of disaster.

The party consisted of Brainard, Jewell, Ellis, and the Eskimo, with two fine teams of ten strong dogs each. They were carefully and thoroughly fitted out, the equipment being much superior to that of the preceding year. The ration was increased, and half the meat was frozen musk-ox. The sledges were of the new pattern, and were provided with extra interchangeable parts. The cooking and sleeping gear was in excellent condition, and was so arranged that one, two, or three men could travel, or be safely left alone.

The plan contemplated the return of Jewell's sledge by April 23d, and that Lieutenant Lockwood himself should turn back from the north by May 19th, and reach the Grinnell Land coast by June 1st. Experience has shown that no party can safely *advance* in Arctic travel later than the last days of May. The *constant* weights of the advance sledge were reduced to

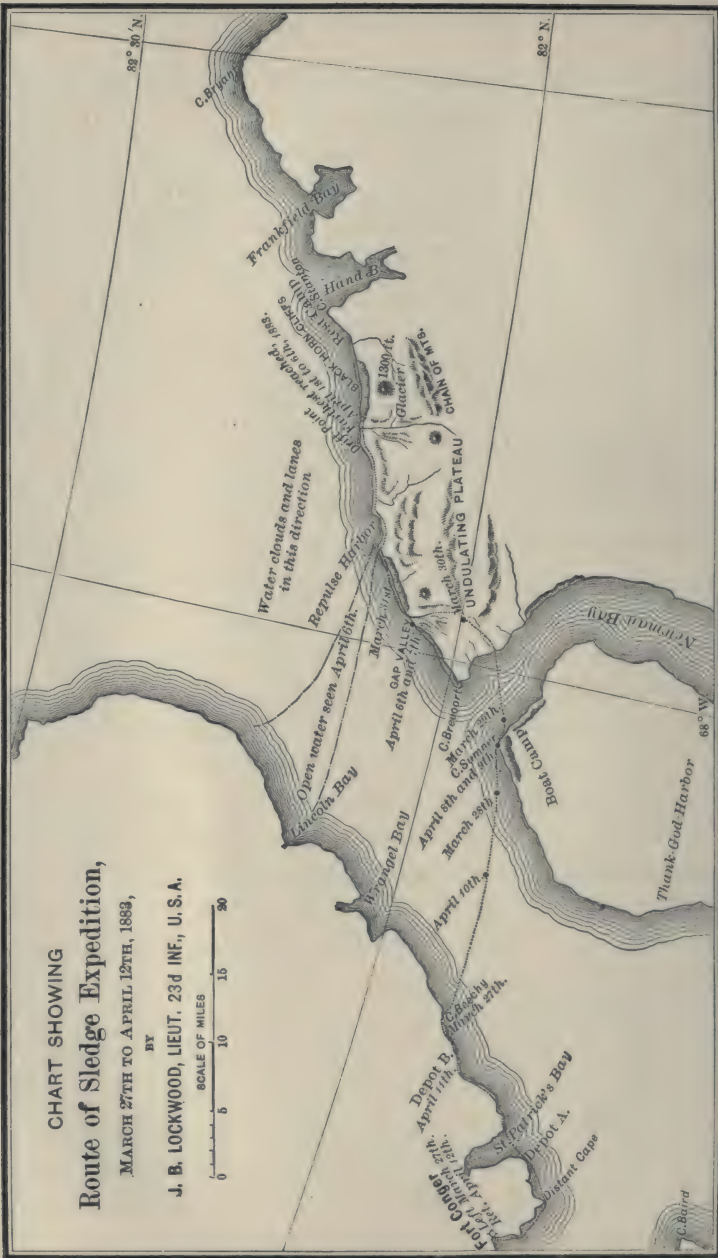
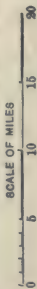
three hundred and twelve pounds, and of the supporting party to two hundred and eighty pounds.

The dogs averaged seventy pounds each in weight, and on leaving Polaris Boat Camp were to haul twenty-one hundred pounds. This weight was decided on after careful experiment, by which I determined that our teams could start on a long journey hauling one hundred and fifty per cent. of their own weight. The Hudson Bay rule of a hundred pounds to the dog is slightly under this. Experiments made over a measured course demonstrated that our dogs could rarely travel over six miles an hour with a light load, and half that distance with a heavy one.

On April 2d my journal says: "The mean temperature for March has been abnormal. The mean of the last seventeen days was -10.1° (-23.4° C.), by far the highest known in this part of the Arctic regions. It is very probable that there is open water again in the Polar Sea, and perhaps in Smith Sound. The high temperatures gave me much uneasiness, which the present cold snap has removed, about Lieutenant Lockwood's progress north, and caused me to insert the clause in his orders about the breaking up of the polar pack."

Lieutenant Lockwood surprised me by returning on April 12th. His party was in excellent condition, but open water, and the disintegration of the polar pack near Black Horn Cliffs, compelled them to turn back. The value of one year's Arctic experience, and of careful attention to equipment, was shown by this trip. The rapidity of the journey was extraordinary, and they reached Black Horn Cliffs from Conger in six days, against *twenty-two* days in 1882. They hauled from Cape Sumner twenty-two hundred pounds, and arrived at the cliffs on April 1st, *twenty-four* days earlier than in the preceding year. They had at that camp forty-one days' full rations for the advancing party, and seventeen for the supporting sledge. Lieu-

CHART SHOWING
Route of Sledge Expedition,
 MARCH 27TH TO APRIL 12TH, 1883,
 BY
J. B. LOCKWOOD, LIEUT. 23d INF., U. S. A.



tenant Lockwood was then looking forward to reaching either the northern end of Greenland or latitude 85° , and with good reason. Should he travel even as slowly as in 1881, he would yet have seventeen days to the northward of Lockwood Island.

Unfortunately this was a bad year for our contemplated work—as well as for the opposers of an open Polar Sea. “On our arrival at Drift Point,” says Lieutenant Lockwood, “there was seen a continuous belt of young ice a hundred yards and more wide between the polar pack and the shore, with many water-holes and small cracks in it. Thick water-clouds were visible to the north.” A seal (*Phoca hispida*) appeared in the open water.

The next morning a stone would go through the ice almost anywhere, and the space of open water along shore was continuous. To pass around the edge of Black Horn Cliffs was impossible, owing to their precipitous bases being washed by the open sea. With great exertions Lieutenant Lockwood, in reconnoitring, reached the summit of the cliffs, thirteen hundred feet above the sea, being obliged to cut steps up the face of a sloping glacier discovered by Brainard, but it was impracticable to get the sledges over this point.

Of the open water Lieutenant Lockwood's report says: “One clearly defined lead ran northwest toward Cape Joseph Henry. Misty clouds obscured the entire northern horizon.” While waiting at Black Horn Cliffs the temperature fell to -41° (-40.6° C.). Ice formed around the cliffs sufficiently strong to bear the sledges, and on the morning of April 4th an attempt was made to pass over it with light loads. The entire polar pack suddenly set off to the northward, and Lieutenant Lockwood says “two or three of the dogs went into the water, and I suddenly perceived that the ice was moving off shore.”

Lieutenant Lockwood, ignoring the danger to himself, ordered Christiansen to find his way to land and ran after Sergeant

Brainard, who was a few hundred yards ahead picking out a road. The Eskimo, however, was equally as brave and self-sacrificing, for, lashing his dogs to a gallop, he overtook Brainard. By this time the pack had moved out so that a lane of water several yards wide separated them from shore, except a small floe, which, breaking and twisting, jammed between the main floe and a projecting and fortunately grounded floeberg. The main polar pack moved slowly to the northeast, so that they were able to hold the small floe against the grounded ice until, one by one, dogs, men, and baggage were hauled up over its edge. "Soon," says Lieutenant Lockwood, "there was a belt of open water a hundred yards and more along shore, and in two hours the main ice had moved two hundred yards to the east." The movement was general, as the corresponding motion of floebergs off shore indicated.

Lieutenant Lockwood turned homeward, and from high land near Drift Point, on April 6th, had an excellent view of the scene. He says: "The pack was separated from the shore east and west, as far as eye could reach, by open water perfectly free from ice and from two hundred yards to a half mile wide. In the direction of Lincoln Bay it expanded into a broad sea from three to five miles wide. . . . I looked at it attentively through the field-glasses, and it apparently extended across the straits (Robeson Channel). The polar pack was moving rapidly toward the east, as was plainly apparent by aligning any part of it with an object on shore. To the north several large leads of water were seen in the distance and smaller lanes near by. Dark, misty clouds hung about the northern horizon."

It is perhaps well for me here to put forth my views as to the physical conditions which exist to the northward of Greenland and Grinnell Land. In doing so I claim for them no special value nor scientific merit, as they are entirely personal and

theoretical. I doubt not that in the vicinity of the North and South Poles are glacial lands entirely covered by ice-caps of enormous thickness, which throw off the huge floebergs of the north and the yet more remarkable flat-topped icebergs of the south. The north polar land is, I believe, of limited extent, and its shores, or the edges of its glaciers, are washed by a sea which, from its size and consequent high temperature, its ceaseless tides and strong currents, can never be entirely ice-clad. Nordenskjöld believes in the open sea, convinced by the polar pack setting northward from Mussel Bay in 1872. Nares even would seem to be uncertain on this point, else he never would have equipped Commander Markham with the heavy boats hauled by his party in 1876. The wise discretion of Nares is evidenced by Pavy's experience in 1882, and this of Lockwood in 1883. That the Tegetthoff and Jeannette drifted northward winter as well as summer is confirmatory evidence of an "open polar sea." Far be it from me to advocate a navigable polar sea. On the contrary, I am firmly possessed with the idea that an ice-belt from fifty to a hundred miles wide borders the lands to the southward, and that the water-space to the northward can only be entered in extremely favorable years by the Spitzbergen route.

In the vicinity of Repulse Harbor, in 1883, Lieutenant Lockwood examined a floeberg, which was about forty feet high, with reference to stratification. He counted a dozen parallel and clearly defined strata from the top half way down.

At Repulse Harbor Lieutenant Lockwood recovered the union jack, sextant, etc., abandoned by Lieutenant Beaumont, R.N., in 1876, under the desperate circumstances narrated in a preceding chapter.

Since my return I have had the pleasure of transmitting to the British Admiralty this national ensign, which is so closely identified with one of the displays of heroic endurance and

devotion to duty which have been so frequently exhibited by officers of her majesty's service.*

This Greenland journey was by no means fruitless. Sergeant Jewell made a series of valuable tidal readings at Black Horn Cliffs, Repulse Harbor, and Cape Sumner, which must be of marked assistance in enabling experts to determine the co-tidal lines of the polar ocean and Robeson Channel. Lieutenant Lockwood complimented Sergeant Jewell on the ingenuity, fidelity, and perseverance exhibited in this work.

In order to supplement the tidal readings brought back by Sergeant Jewell, I sent him in charge of a party to Cape Beechy, on May 6th, while a second party went to Cape Baird under Sergeant Gardiner. These parties made a series of tidal

* Since the above account was put in type, I have received the following letter, conveying to me the thanks of the British Government for my action in this matter:

BRITISH LEGATION,
WASHINGTON, September 17th, 1885.

HON. T. F. BAYARD.

Sir: With reference to your note of the 20th of July last, forwarding the Union Jack abandoned by Captain Beaumont in 1876, and recently recovered by Lieutenant Greely's exploring party, for presentation to Her Majesty's Government, and with reference to my note of July 21st, I have the honor, in pursuance of instructions from the Marquis of Salisbury, to acknowledge the receipt of the Flag on behalf of the Lords of the Admiralty, and to express their high appreciation of the action of the United States Government in this matter, and to inform you that the Flag will be sent to the Naval Museum of Greenwich with an explanation of the circumstances connected with it.

Their lordships further desire that their thanks may be conveyed to Lieutenant Greely for bringing the Flag at a time when he was surrounded with great difficulties and danger.

I have the honor to be, with the highest consideration,

Sir, your obedient servant,

L. L. SACKVILLE WEST.

readings in connection with those made at Conger. Later in the month other tidal readings were made at Capes Beechy, Baird, Distant, and Craycroft, and Dutch Island.

In addition to his other work, Jewell determined the position of Cape Beechy to be $81^{\circ} 52.5' N.$, and to be 7 minutes 22.3 seconds east of Conger in time. Sergeant Israel determined the latitude of Cape Baird to be $81^{\circ} 32' 27.7'' N.$ (possible error $+ 0.9''$), and the longitude 57.5 seconds (in time) east of Fort Conger. This determination fixes the latitude of Cape Lieber at $81^{\circ} 28' N.$

During the journey to Craycroft Sergeant Gardiner made a special examination and fine collection of the fossils at that point, and Brainard discovered a fossil forest near Cape Baird, where one tree, over a foot in diameter, was found by him at an elevation of eight hundred feet above the sea.

April proved to be an exceedingly cold month, the mean being but slightly higher than that of March; a minimum of -37.3° ($-38.5^{\circ} C.$) was noted, and the temperature did not rise above zero ($-17.8^{\circ} C.$) until the 27th, except one observation. The snow-bird came ten days later than the preceding year, and the owl was still more tardy. We were so unfortunate in May as to lose three hundred pounds of fresh meat, which became tainted in its interior, although perfectly good externally. This was partly made up by three musk-cattle killed by Connell, who was an excellent and fortunate hunter, in Black Rock Vale, where I had sent him hunting with Jens. These cattle were killed thirty-five miles from the station, and Connell is entitled to much credit for his persistency and energy in hunting during the violent storm which prevailed most of the time that he was absent. The men's health remained good, although a number who abstained from fresh seal-meat were hardly as robust as the others.

CHAPTER XXVII.

THE CROSSING OF GRINNELL LAND.

ON his return from Black Horn Cliffs, Lieutenant Lockwood was extremely anxious to renew the attempt northward. After thoroughly considering the situation, I decided against its advisability. I should have sent him north again if the coming of the vessel had been a certainty, or another winter in Conger had been in prospect. As it was, I concluded to order him across Grinnell Land to the western ocean by the way of Archer Fiord, a trip which I had contemplated making myself on the return of Jewell's supporting sledge. Dogs, rations, and sledging outfit were already in perfect condition, and it needed only the order, which was issued on April 24th.

Lieutenant Lockwood left the following day, with Sergeant Brainard and Christiansen, the latter driving a team of our best ten dogs. They had provisions which would permit them to be absent thirty-one days from Sun Bay. In addition to their usual sledging-gear, they took a small hand-sledge, a dog-tent, and two knapsacks, to provide against all possible contingencies of land travel. A supporting sledge, under Sergeant Elison and Eskimo Jens, was directed to accompany them for two marches.

Lieutenant Lockwood on leaving was of the opinion that the feasibility of crossing Grinnell Land was exceedingly remote, and requested that he be allowed to visit Lake Hazen if his persistent efforts should fail in the route designated by me. His

report says: "I hardly expected to get farther than the head of Archer Fiord with the large sledge, or to be able to proceed many days beyond with the small one."

Deep, soft snow made travel difficult across Discovery Harbor, but they passed the depot at Sun Bay and made their first camp at Stony Cape. Travel improved the second day and they marched to a point six miles southward of Hillock Depot. Of the cache left at that depot by Lieutenant Archer, part had been eaten by foxes, but the rations found in metallic cases and rubber boxes were taken with them. Ptarmigan, hare, and fox tracks were observed, and a seal-hole at the entrance of Chandler Fiord.

At camp No. 2, two days' rations were cached for their return.

The third march took them to Depot Point. The supporting sledge accompanied them a little over an hour on this day's journey, and turning backward reached Sun Bay in seven hours. The load on the advance sledge at that time was about nine hundred and fifty pounds.

The next march, a short one, carried them to the head of Ella Bay, where they camped in order to examine the country in advance. This fourth camp was situated about sixty-seven miles from Fort Conger. The extraordinary difference between this journey by dog-sledge and the slower method by manpower is illustrated by Lieutenant Archer's experiences in 1876, when a fourteen days' march with an eight-man sledge was required to make this distance.

Near this camp tracks of foxes, hares, lemmings, ermine, ptarmigan, and musk-oxen were noticed. The musk-oxen had passed only a few days before along the shore of Archer Fiord northward to Record Point. A palæocrystic floe was observed near the head of the fiord.

Of Ella Bay, Lieutenant Lockwood says: "The valley be-

yond has a general trend to the southwest, and is walled in by grand heights and cliffs on each side. Its lower part is occupied by a small lake."

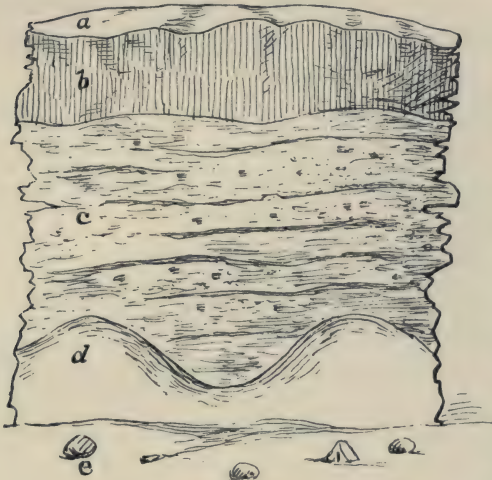
By a preliminary trip, finding the route practicable up Ella Valley, Lieutenant Lockwood left on the evening of April 29th, and a short march of ten miles carried them to the base of the glacier, which was one hundred and fifty feet above the sea. Lieutenant Lockwood says: "Here the terminal face of the large glacier stretched from side to side of the valley, and a very short survey of the scene made it evident that nothing could be done in this direction with either of the sledges." The glacier, which seemed about ten feet high when first observed, proved to be from one hundred and seventy-five to two hundred feet in height (see Nos. 1 and 2).*

Travel to the glacier from the bay was very difficult, owing to deep snow and projecting stones in the bed of the water-course, which was necessarily followed. During the march a lake, "four miles long, which occupied the breadth of the valley, and was covered with snow," was passed.

During two days spent at this place, Lieutenant Lockwood and Sergeant Brainard climbed the precipitous cliffs to the eastward of the glacier, attaining an altitude of four thousand four hundred and forty-four feet, on a summit which was named Mount Difficult. "To the south," says Lieutenant Lockwood, "lay a mass of cone-shaped mountain peaks, separated by deep and narrow valleys, the whole covered with ice and snow. Several glaciers were seen in this direction. To the west and southwest many isolated summits were also noticed, but they seemed mostly great dome-shaped heights, rather than peaks, rising like waves on the horizon. A peak was noticed at a

* The numbers used in this Chapter, refer to fac-similes of Lieutenant Lockwood's original sketches.

great distance, probably seventy-five miles, bearing south 60° west. Northwest of the valley could be seen several glacier-like formations. The country to the west and south is apparently ice-capped. At this season, however, it is very difficult to distinguish at a distance between ice and snow; the only sure test is the sight of a glacier-wall or break in the surface. These



Ella Valley Glacier.—Section of Face of Glacier.

- a. Edge of top overhanging in places as it appears from below.
- b. Pure ice of a beautiful green color.
- c. Ice white and chocolate color, full of small stones and streaks of mud or earth.
- d. Apparent snow bank but probably moraine covered with snow.
- e. Level of valley, scattered boulders and lumps of ice.

walls almost always have a greenish tint.

“The valley of Ella Bay above camp continued to trend to the southwest for about twenty-five miles, where the pyramid-shaped mountain terminated it. The glacier occupied its whole extent, and may have a continuation to the south.

A branch glacier came in from the

north just above the camp. . . . The face of the glacier near camp was sixteen hundred yards, and the vertical front was one hundred and fifty feet high from sextant angles. . . . As the valley apparently narrowed little or none in width, I assumed that its gradient remained the same, and that the glacier attained an immense depth.”

Contrary to general experience in Grinnell Land, this glacier

had considerable chocolate-colored ice, full of small stones and streaks of mud or earth. The face of the glacier must have been nearly two hundred feet high, as it measured one hundred and sixty feet above the top of two high snow-banks, which were probably snow-covered moraines. The edge of the glacier overhung slightly in places. Below this was a section of clear ice, which was of a beautiful green color. This was in parallel layers and gave place lower to the main ice, which was dead white, broken by the streaks, etc., referred to.

On May 2d Sergeant Brainard visited the north flank of the glacier, and found travel possible for a short distance along its precipitous sides, but could discover no way of flanking it or ascending to its surface.

Lieutenant Lockwood decided to try the route via Beatrix Bay, and if necessary by Simmonds Bay. Having determined the position of the glacier, which was situated in 81° N., 70° 41' W., he started for Beatrix Bay, making two leisure marches as he had abundant provisions. Lieutenant Lockwood says:

"The cliffs around these bays (Ella and Beatrix) are particularly grand, rising almost vertically three thousand feet and more. I measured those on the south side of Ella Bay, and found them four thousand and ninety-seven feet high. They are probably all ice-capped. Miniature glaciers were observed hanging from the edges in places."

A day was spent in reconnoitring the route to be followed. The main valley, trending north-northwest, was taken, which is, says the report, "three miles wide, and is walled in by the most impressive cliffs, very steep and of immense height. A march of nine miles brought us to its head (seven hundred feet elevation), and it hardly appeared practicable to proceed farther with a large sledge, and we again lay over a day to reconnoitre."

They ascended the highest cliffs, crossing a lake which occu-

Fig 1. Face of glacier above Emma Bay
(from tent)



April 30

2

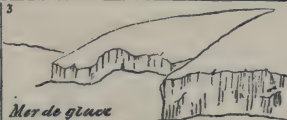
Plank view of same
from S.E. corner



3

Mer de glace
"Chinese wall"
just west of divide - looking east
(at Lake Harry)

May 18



May 1

4 Mer de glace, "Chinese wall"
where fire approached, just east
of Camp III



May 10

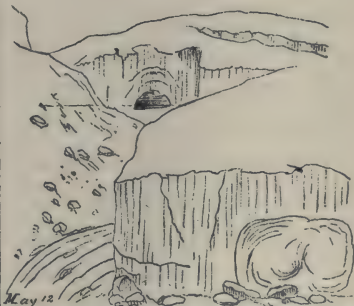
5



May 18

Glacier "floo-berg", head of Greely F^{ld}
(Anconetta Bay)

6



May 12

Off-shoot of the Mer de glace. The same as Fig. 2.
The hill sides on the left of each correspond.
Near head of lake between Camps XII & XIII

XII & XIII

pied an elevated depression on a divide between two water-courses, and apparently drained both southward to Archer Fiord and northward toward Chandler Fiord. He says: "The Garfield and United States Mountains were quite prominent, and in the midst of the former the Henrietta Nesmith glacier was seen. The depression occupied by Lake Hazen was readily detected. The most conspicuous object was a line of cliffs about six miles to the north, seeming to mark a large valley (Musk-ox Valley) or lake extending from east to west. Toward the southern quadrant the country seemed greatly elevated, and had every appearance of being ice-capped. To the south about ten miles was an ice-wall, doubtless the flank of the branch glacier noticed south of Ella Bay. Many dome-shaped heights (hog-backs) were seen in this direction, most of them over five thousand feet in altitude."

Lieutenant Lockwood concluded that the cañon to the southwest would afford a route outside, but first reconnoitred the valley (Musk-ox Valley) to the north.

The dog-team and small sledge were taken, by which they reached a crest overlooking Musk-ox Valley, the descent into which was so steep that it required an hour's travel through a gorge (called Rocky Gorge by Lieutenant Lockwood) to reach a river in the valley. The valley trended from west-southwest to northeast, and appeared level, but two hours' travel to the northeast showed that it drained in that direction. The river evidently flows into Chandler Fiord at Ida Bay.

The field journal says: "The valley (Musk-ox) is three or four miles wide, bounded on the north side by cliffs, and on the south by similar, but not so precipitous, heights. Its extent, as seen during the day, was about fifteen miles in a straight line. Before returning to camp we saw four musk-oxen, and shot one for dog-food."

This proved to be a cow, which was nearly ready to deliver a calf. This was the first musk-ox killed during the year, and, in fact, the only one, except those obtained at Black Rock Vale.

The direction in which this valley trended decided Lieutenant Lockwood to follow it; but, to succeed, he found it necessary to reduce all weights to the lowest limits. The sledger-runners had all been badly worn by the preliminary journey, and Lieutenant Lockwood concluded that he could scarcely travel longer than twelve days with the sledge. He returned to the large tent and sledge, which he considered his base, situated in $81^{\circ} 17' \text{ N.}$, $70^{\circ} 46' \text{ W.}$, and seven hundred feet above the sea. The party left again on the morning of May 8th, with eleven days' rations for men and dogs, which, with the sledge and remaining outfit, weighed only three hundred and twenty-eight pounds. They reached Musk-ox Valley through Rocky Gorge, and, travelling about six miles up the valley to the west-south-west, camped in latitude $81^{\circ} 18.5' \text{ N.}$, $71^{\circ} .01' \text{ W.}$

The following day's march carried them to the apparent end of the valley, where a couple of hours were lost in determining their route. They finally followed a cañon to the south, which seemed to end in a glacier visible eight or ten miles in advance. This cañon was exceedingly rough, its bottom consisting entirely of huge rocks and stones which were scarcely snow-clad, but no other route seemed possible. Lieutenant Lockwood says: "The sledge had overturned shortly after starting on this day's march, the uprights of one runner being all broken short off in the mortices, but we mended it after a fashion. Now the runner flopped over so continuously that it was necessary to camp and fix it after eight miles' travel."

This camp was in $81^{\circ} 15.5' \text{ N.}$, $71^{\circ} 46' \text{ W.}$ There, owing to the broken sledge, not only a day's rations for return, but snow-

shoes and everything else which could be spared, were left behind so as to ensure the greatest success.

The gap took them into a broad, plain-like valley, with a considerable lake in its centre. "The wall of a glacier apparently rose all along the south side of the valley just back of the low range of hills on that side, and the country behind it seemed one continuous glacial surface (see No. 4).

A short day's march to the southwest disclosed to them an extraordinary physical condition of the country. They discovered that the ice-capped land to the south of them presented to their view a vertical face of solid ice, ranging from one hundred and twenty-five to two hundred feet in height. The perpendicular face of the ice-cap, and its close conformity to the face of the country, caused Lieutenant Lockwood to temporarily name it "The Chinese Wall" glacier, which was later, in honor of the great Agassiz, designated, with Lieutenant Lockwood's hearty concurrence, *Mer de Glace Agassiz*. As that officer expressed it to me, on mountain tops or in the beds of valleys this ice ran across the country with an almost unvarying height in the same manner as the Chinese wall.

Camp was made at an elevation of about twelve hundred feet above the sea, in $81^{\circ} 08''$ N., $73^{\circ} 41'$ W.

"At this point," says Lieutenant Lockwood, "the glacial wall, by sextant angles and distance paced off, was one hundred and forty-three feet high. We now followed along the wall, gaining a greater altitude in every hour's travel, keeping the same general direction until we gained the top of what is doubtless the water-shed of Grinnell Land. A detour of a mile or two to the north gave a slightly greater elevation, the barometer showing twenty-six hundred feet above the sea-level. The view to the south was cut off by the *mer de glace*, which by its gently undulating surface was visible a few miles beyond the edge form-

ing the horizon in that direction. . . . To the right (east-northeast) were seen several lofty domes, evidently ice-capped. . . . Toward the northwest several miles a large lake was discovered, probably ten miles across. A streamlet extended to the southeast from it to the 'Chinese wall,' and occupied a depression forming a wide sloping valley. . . . A mountain peak appeared to the north, which, from its bearing and distance, must have been Mount Arthur. The ground adjoining the great wall on either side of the divide had a gradual slope to the north. I was surprised to see no continuous ravine, or noticeable water-course, which served to drain the melted ice to the east and west.

"Many lakes were seen and crossed along the wall (glacier front), and in places narrow ditch-like gulches, washed out evidently by the water; but the glacier face extended up hill and down hill, across the country, in a very arbitrary fashion." Just to the westward of the divide, beside a "steep snow-bank with an almost vertical face of sixty feet," they made Camp No. 4, in $81^{\circ} 05' N.$, $74^{\circ} 41' W.$

The next march was down a narrow gorge bounded on either side by towering mountains of so steep a gradient that in forty-five minutes they reached a deep, narrow valley of a thousand feet less altitude. This route was the only one by which the descent could be made.

Several miles down the valley they passed a branch valley to the left, filled by a large glacier which discharged into a considerable lake and a second glacier also entered the same lake from the southwestern end. On this lake they made Camp No. 5, in $80^{\circ} 56.5' N.$, $76^{\circ} 13' W.$

The sixth march, rapidly descending, brought them to the salt water and the head of a fiord, which was called by Lieutenant Lockwood, in my honor, Greely Fiord.

At the head of this fiord the last glacier discharged. "A few miles farther west a large twin glacier came in from the south. About eight miles from the lake we passed through some low, oval-shaped mounds of ice a foot or two high, scarcely resembling anything seen before. Two miles farther on we crossed the tracks of a bear going up the fiord, evidently followed by a fox. After proceeding a half dozen miles we came to a glacier meeting the valley at an acute angle. It filled quite a wide cañon or valley coming from the east (see Nos. 8, 9, and 10). We passed it on a terrace between its flank and the cliffs to the right. We proceeded about twenty-six miles down the fiord and camped at the farthest, May 13th, in a heavy snow-storm, at 12.30 P.M."

By fasting nineteen hours, and reducing the rations for dogs and men on the homeward journey to the lowest limit, they were enabled to remain at the farthest until the storm abated.

The latitude of that camp was $80^{\circ} 48.5' N.$; longitude, $78^{\circ} 26' W.$; magnetic variation from fourteen observations, $116^{\circ} 35' W.$, with a possible error of $1^{\circ} 3'$.

Lieutenant Lockwood's journal says: "After travelling nearly an hour we came to a line of what seemed 'floebergs;' there was no *perceptible* difference in any respect; they were detachments from the glacier. After. . . drawing the outlines of some of the bergs (see Nos. 5, and 7) we proceeded."

Lieutenant Lockwood and Sergeant Brainard ascended a high cliff four miles to the west of the camp. Of the outlook, Lieutenant Lockwood speaks as follows:

"Greely fiord is between sixty and eighty miles long, the south shore being considerably longer than the north. Whether the farthest cape (Lockwood) on the south side was on the same or another land could not be determined. The fiord near its head

7. Glacier "floe-burys" at glacier
at head of Greely Fjord



May 13

8

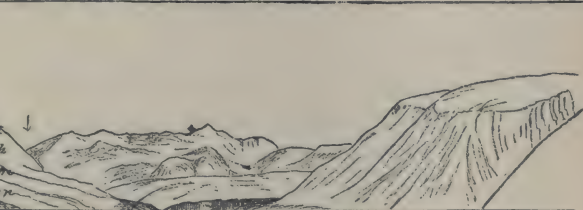
Glacier entering Valley
The cliffs to the right are
at the head of the fjord.
(Antoinette Bay)



May 12

9

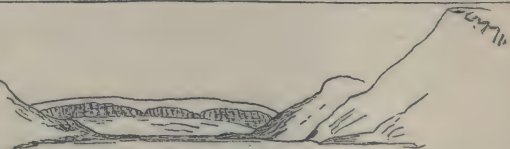
Lake, glacier
and mountains
from west end of lake, C. K. R.
The route lies through
the fore-ground of the
sketch in the direction
of the arrow head



May 12

10

Glacier and cliffs from
east end of lake; Camp X
is in the right fore-ground



May 12

11 View to the west
from head of fjord

The cape to the left
marks west extreme of
bay at head of Greely Fj.



May 13

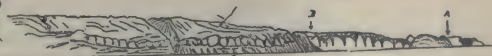
12 View to the west
from farthest



May 14

13 Farthest land on south side
(From out from shore some miles)

The arrow marks a seeming
branch fjord or channel;
2 is probable branch fjord.



May 15

14 Head of Fjord from farthest
Camp X lies under the arrow



May 17

may be ten miles wide, and at its mouth fifteen or more. The whole shore is bounded by steep, high cliffs, broken by ravines, valleys, and a few branch fiords. At the head it forms two bays, the one to the north probably similar to the southern one traversed by us, which was the outlet of a long valley or lake. Thirty or forty miles from the north shore, extending east and west, was a conspicuous mountain range. Toward the northwest, nearer, was a large glacier. From the cliffs ascended (elevation twenty-two hundred and fifty feet) the country to the south appeared more uniform, being a series of immense ice-capped undulations of great elevation. A glacier was distinguished twenty miles to the south, apparently another offshoot of the 'Chinese wall,' as the face of a great *mer de glace* was traced a few miles toward the east and west.

"En route Sergeant Brainard discovered fossil remains on the mountain top, and soon we had quite a collection. There was a shell, and what we took to be petrified wood, fish, etc. A few specimens of grasses, etc., were also collected, and a ptarmigan was seen."

That evening Lieutenant Lockwood travelled several miles out into the fiord, and examined the country to the westward with a telescope (see Nos. 11, 12, 13, and 14). "After going out some distance," he says, "another point began to make its appearance beyond the farthest one heretofore seen on the south side, the first point being ten or fifteen miles, and the second from twenty-five to thirty miles distant. Between the two seemed a fiord, the same disclosed from Fossil Mountain, doubtless, and a few degrees in azimuth farther to the right. Sergeant Brainard and I examined the mouth of the fiord carefully with a telescope, which after some time brought out very faintly a cape (Lockwood) still farther to the west, projecting a degree or two beyond the last, and estimated at sixty miles distant.

Between Cape Lockwood and land's end (Cape Brainard) repeated scrutiny revealed nothing but the horizon."

On May 16th the party started homeward. Near the head of Greely fiord two seals (*Phoca hispida*) were seen, but they were unable to obtain them.

The field journal says: "The little sledge sank frequently until the snow was above the slats. Journey extremely fatiguing. The dogs begin to show the effects of short rations; there is now nothing to give them. Of our own rations, three meals of sausage were made to last six, which, with seven ounces of hard bread, was entirely insufficient."

Eleven hours' steady travel brought them to their old camp on the lake. The day following, in crossing the snow-bank, Lieutenant Lockwood says: "The dogs climbed to the top, and by means of a long seal-thong pulled the sledge up from below with everything on it." At this camp, the dogs being very weak, he was obliged to kill one of them, the feeblest, for dog-food. It was completely devoured by the rest of the team during the night.

On May 18th, before starting, Lieutenant Lockwood ascended, with Sergeant Brainard, a height two miles to the south to observe the country. He says: "The great (glacier) wall referred to above could be clearly seen to trend off to the southwest (see No. 3), and when lost sight of was distant about forty miles. To the east of it, but much nearer (about fifteen miles), were the ice-capped domes or hog-backs referred to.

"The glacier at the head of the lake was clearly seen to issue from the great mer de glace; the point of confluence was only about six miles distant.

"The whole surface of the country to the south of the wall (glacier front) seemed nothing but ice." During the march this day Lieutenant Lockwood followed the glacial wall, and dis-

covered a small lake near it. A snowbird and hare-tracks were seen.

Lieutenant Lockwood says: "I had intended ascending the glacier near the divide, at the only place where such a thing was possible; but, on account of the state of our eyes and the strong wind, I gave it up."

Three marches brought them to their base of supplies at the head of Beatrix Bay, both men and dogs in a ravenous state of hunger. Of his supper on starting for the last march, Lieutenant Lockwood says: "No bread, sugar, or coffee. Rabbit stew, the pieces of meat being stolen by Howler." Fresh tracks of three musk-oxen, and a passing owl, were observed on the 20th, as well as traces of foxes, hares, lemmings, and ptarmigan.

On his return Lieutenant Lockwood examined the valley at the head of Simmons Bay, which was found to be filled by an extensive lake some fifteen miles long. He was surprised to find that the head of the lake was separated from Musk-ox Valley by a low divide about two hundred feet high, so that the river of that valley must necessarily drain into Ida Bay. The lake in Simmons Valley, walled in by immensely high cliffs, drains into Archer Fiord through a chain of small lakes. The entrance to the valley was formed of two huge walls, which separated just enough to permit the passage of the stream.

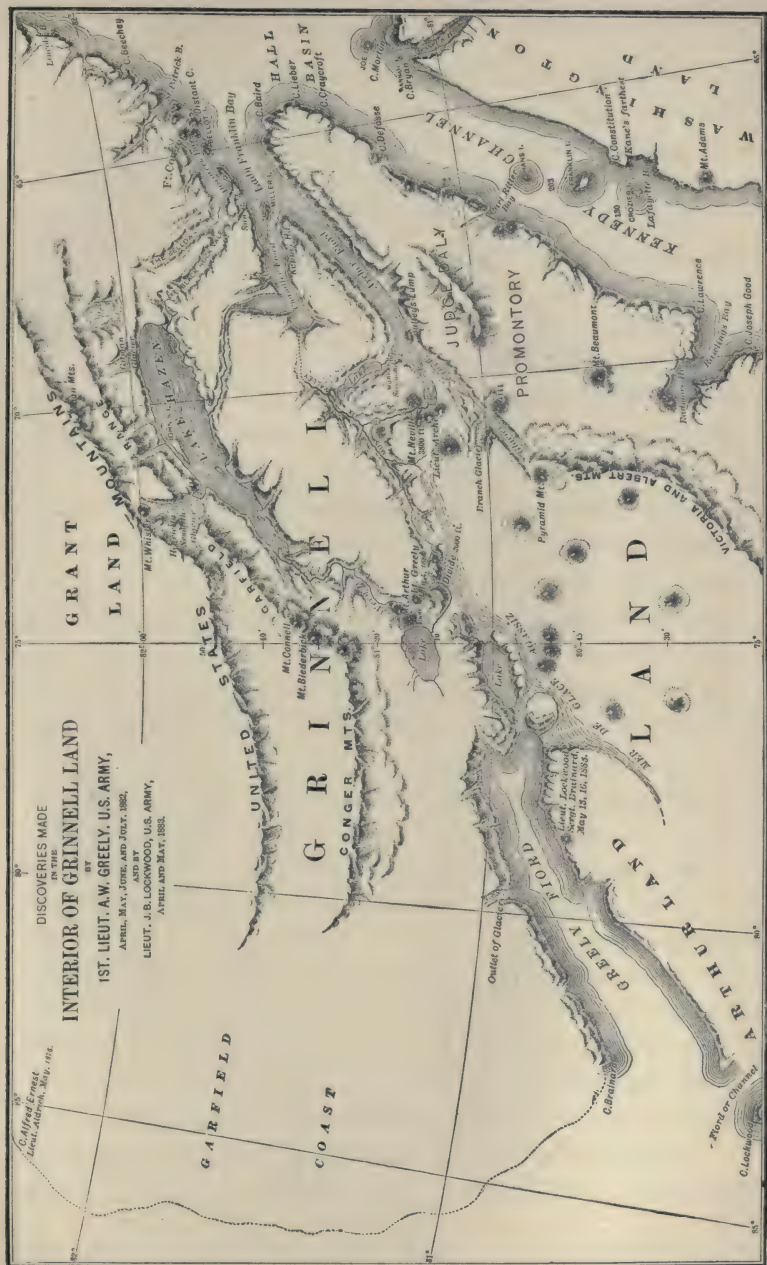
On May 23d Christiansen killed a harbor seal (*Phoca hispida*), weighing about two hundred pounds, in Archer Fiord.

On May 26th they reached Fort Conger, having been obliged to abandon one of the dogs, Disco King, within sight of the station. The case of this animal illustrates the spirit of faithfulness to be found in a good Eskimo dog. He worked until his strength was entirely gone, and when released from the harness died of exhaustion, without being able to crawl to the station, which was in sight.

DISCOVERIES MADE
IN THE

INTERIOR OF GRINNELL LAND

1ST. LIEUT. A.W. GREELY, U.S. ARMY,
APRIL, MAY, JUNE, AND JULY, 1862,
AND BY
LIEUT. J. B. LOCKWOOD, U.S. ARMY,
APRIL AND MAY, 1863.



This party travelled four hundred and thirty-seven miles during their month's absence, and encountered great hardships and privations, on which I have not dilated. Both the journey and the discoveries are extraordinary, and speak for themselves.

I add, from Lieutenant Lockwood's sledge journal, a description of one of the most remarkable discoveries in the Arctic regions—the Mer de Glace Agassiz, which extends for eighty-five miles across Grinnell Land, and, with its vertical front of an average height of a hundred and fifty feet, forms, with the glacial ice-cap of the United States Mountains, wonderful boundaries of the no less extraordinarily fertile belt of Grinnell Land, with which they strangely contrast.

“The great mer de glace discovered on this trip,” says Lieutenant Lockwood, “extends, I think without doubt, continuously from Archer to Greely Fiord. From a mountain near the second camp on our return, the wall was seen trending off to the southwest to an estimated distance of forty miles. It was also seen in other places than have been mentioned in my field journal, and the general aspect of the country to the south seemed to confirm this idea.

“It is hard to form an opinion of the extent of the mer de glace to the southward of its northern face. The *ice* was often clearly discerned for six miles or more, and the prospect to the south was always *white*, and apparently that of an ice-clad surface,—very high.

“On account of this elevation I could rarely see very far *directly south*, even from mountains. Judging from this fact, the mer de glace must be of enormous depth just back from its face, unless its base rises in altitude toward the south, which the slope of the ground to the north renders unlikely.

“The height of the wall (vertical face) bears an insignificant proportion to the elevation back of it; that at the head of the

valley of Ella Bay was one hundred and sixty feet above the terminal moraines, and at the camp near the divide of Grinnell Land one hundred and forty-three feet. I think the latter exceptionally low. Both heights were determined by sextant and distance paced off. The wall was much higher in some places. This wall is lined all along its foot by blocks and fragments of ice constantly breaking from the face above. The noise of falling ice was often noticed.

"No moraines or foreign matter of any kind were observed on the surface, and crevices were extremely few and insignificant, except on the offshoot above Ella Bay and the two above Greeley Fiord. The surface was often noticed to have a mottled appearance, due to slight depressions in its gentle undulations."

The endurance, loyalty, and pluck shown by Lieutenant Lockwood and Sergeant Brainard were commendable to the highest degree. To complete to the utmost their explorations and discoveries, the entire party lived on half rations for a week, besides suffering other great discomforts attendant on such a journey. Sergeant Brainard's sterling qualities were shown in this as in all other works.

Lieutenant Lockwood's loyalty in this matter impressed me with particular force, and is worth much as an example for future subordinates. He originally deemed the crossing of Grinnell Land an impossibility, and, before starting, had entreated me to permit him instead to examine the glacial system north of Lake Hazen. His persistence, energy and fidelity in pursuing the route via Beatrix Bay, after failing in Ella Bay, evidenced most strongly his determination that his commanding officer's idea of the practicability of crossing Grinnell Land should not fail through him, and resulted in a successful overland journey hardly second to his work the year preceding.

CHAPTER XXVIII.

PREPARATIONS FOR RETREAT.

THE subject of preparing for a retreat by boats, in the case of no steamship arriving the coming summer, had naturally engaged my earnest attention during the second winter.

I never for an instant thought of abandoning the active work and important duties with which I had been charged, in order to devote our energies to preparations for a contingent retreat. Such a course would be to fail in duty to the Government I represented.

On the other hand, it would have been manifestly rash and imprudent not to provide against the non-arrival of a relief steamer. Fortunately I saw my way clear, and so prepared properly for the latter contingency without sacrificing the interests of scientific observation or geographical exploration.

I decided to establish the necessary depot of provisions at Cape Baird, which was twelve miles distant, on the south side of Archer Fiord, and in immediate view of the station. That point well supplied we would be able to cross the fiord under any circumstances, and leave there fully rationed and equipped at such time as might seem most favorable to us.

The order for the work was issued on January 31st, and Sergeant Brainard and Christiansen, with dog-team, commenced it the following day. The men were in health, no absence for a night was contemplated, the temperatures -40° to -45° , (-40° C. to -43° C.), were not as low as had been experienced with-

out mishap by our field parties in extended journeys, and we were working toward home.

To my surprise, the surgeon strongly protested against the work as contrary to precedent, and as entailing unnecessary exposure which was quite certain to result disastrously and be followed by accidents for which he should feel responsible, etc.

The Lady Franklin Bay Expedition was not happy in its surgeon; Dr. Pavy was an excellent physician, but his previous Bohemian life made any restraint irksome and subordination to military authority particularly obnoxious. A man of active mind and quick parts, his lack of any order or system proved most injurious to the natural history interests, which were in his charge. His unfortunate death causes me to refrain from farther comment than is absolutely essential.

His protest against this work, which was not only calculated to, but did, enormously lighten our autumn labors and insured a safe retreat, was the first of a series by which he opposed all work initiated the last year by his commanding officer. The correspondence between us forms part of my official report, and has no place here.

The work was prosecuted as rapidly and continuously as possible during February and March. No accident or injury resulted, and the stores accumulated at Cape Baird proved of vital importance later in the year.

To farther insure our safe retreat, I decided later to bring from Thank God Harbor the English ice-boat left there by Lieutenant Beaumont in 1876. On April 10th Sergeant Rice left, with ten men, to obtain the boat. He was assigned to the command of the party on account of Lieutenant Lockwood's absence and Dr. Pavy's expressed unwillingness to assume any responsibility with this work, claiming that his duties with the expedition were strictly those of a medical officer.

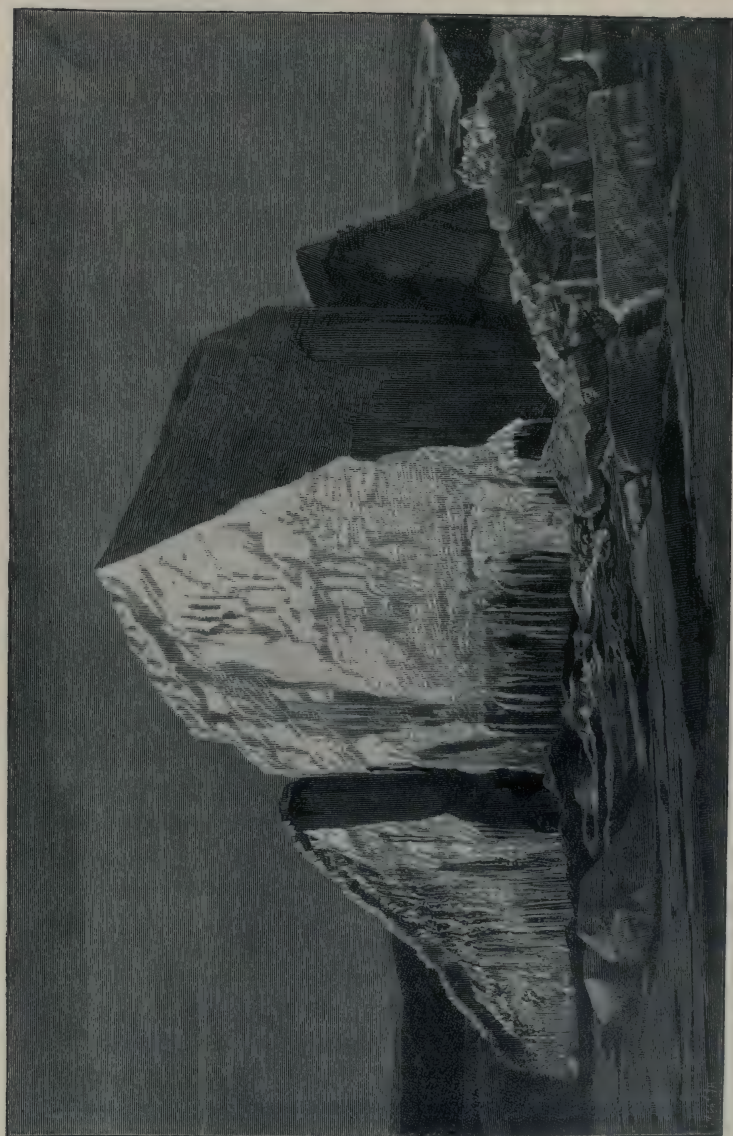
He was ordered to accompany the party as a medical officer, in accordance with his own wish however, for medical considerations. The puppy-team, driven by Schneider, hauled the greater part of the constant weights.



Schneider Hauling Ice with Puppy-team.

[From a photograph at Fort Conger.]

Sergeant Rice returned on the 15th, having made a most successful trip, by which the ice-boat was brought in in perfect condition to Dutch Island, whence it was hauled, a few days



A PALEOCRYSTIC BLOCK, BREAKWATER POINT, LADY FRANKLIN BAY.

(From a photograph.)

later, to Cape Baird and carefully secured for possible autumn work.

The excellent physical health and powers of endurance indicated by this journey were most gratifying. The twelve men sent out were but an average of the party, yet they made the round trip of ninety miles in six days, subjected to a mean temperature of -21° (-29.4° C.) and no single reading higher than -13° (-25° C.). No frost-bite or mishap of any kind occurred. Lieutenant Kislingbury, who volunteered, and Sergeant Brainard, who had just returned from the Polar Sea, were sent out on the 14th to assist Rice, but met them a few miles east of Distant Cape and were only able to haul in the constant weights the last day.

The foot-gear for this trip, skilfully manufactured by Frederick from untanned seal-skin (ugsuk) and German stockings, answered the purpose admirably, and relieved me from apprehension of trouble in this respect during the prospective retreat. As before mentioned, our stock of foot-gear was insufficient for two years, and the non-arrival of the visiting steamer necessitated care and economy.

On May 1st the naturalist of the expedition was directed to furnish by May 31st as complete a report concerning the natural history of the expedition as was possible. A description of all specimens on hand was to be given, and such notes made as would facilitate the speedy rendering of a report on the return of the expedition.

Lieutenant Lockwood classified and arranged the entire collection of natural history specimens, which, labelled and systematically put up for transportation, were securely packed in boxes and barrels. These collections could have been loaded on the expected steamer in a couple of hours, but were necessarily abandoned, except the botanical specimens.



FORT CONGER, GRINNELL LAND, MAY 20, 1883.

(From a photograph.)

A few days remaining after this work was done, Lieutenant Lockwood and Sergeant Brainard were sent, on July 11th, directly to the northwest, in order to determine definitely the physical conditions of the country between Lake Hazen and Lincoln Bay. They were absent three days, travelling on foot, and were assisted in carrying their packs for one day by Biederbick and Henry. They penetrated about thirty miles to the northwest, and saw beyond them, in the same direction, about fifteen or twenty miles distant, a very large glacier.

In July occurred the only marked breach of discipline during our two years at Conger. The surgeon, who had declined to renew his contract that expired on July 20th, refused, on the 19th, to turn over to Lieutenant Lockwood his diary, sealed and addressed, for transmission to the Chief Signal Officer. The keeping of such diary, and its delivery to the Chief Signal Officer, was required by a clause of the orders under which the expedition was organized. The final examination of his diary shows his written statement, that it consisted of letters, to be incorrect.

As Dr. Pavy insisted that he was out of service, and refused positively to obey my orders, it became necessary to place him in arrest, with permission to take such exercise as was necessary within a mile of the station. Every consideration was shown him, notwithstanding which he broke his parole. I was unwilling, however, even then, to resort to any extreme measures, and so did not place him in close arrest, trusting that leniency with him would have no demoralizing effect on the party.

By July 29th all arrangements had been made for the retreat, and an order was issued announcing that the station would be abandoned on August 8th if no vessel should arrive. A party was detailed to proceed to Cape Baird with the launch at the earliest possible moment. The launch and boats had been overhauled, and were pronounced by the engineer to be in excellent

condition. Five thousand pounds of carefully selected coal was screened, bagged, and carried to Dutch Island, where the launch lay.

The wisdom of laying her up at that point was then obvious, as the harbor-floe had never sufficiently opened to permit of her being moved had she been laid up for the winter at the station. Other stores and supplies had also been accumulated near the launch for convenience of loading.

For the greater part of the year, with my clerk, I had been engaged in reducing, arranging, and copying the scientific observations, which, by August 3rd, were completed to July 31st. These records, weighing about fifty pounds, were packed in three tin boxes, which were soldered and thus made water-tight. Two boxes were to be in my charge. These contained original reports, field journals, my own diaries, original sheets of magnetical and meteorological observations, and other official papers. Lieutenant Lockwood was to take charge of the third box, which contained letter-press copies of all scientific observations, star sheets, and the official collection of plants. The work of duplicating these records was great, but I hoped thus to save one set in case of any disaster during our retreat. All private property was abandoned, except eight pounds of baggage for each man and sixteen for each officer. My own extra baggage consisted of a seal-skin jumper, two or three towels, one suit of under-clothing, three pairs of stockings, a woollen afghan, and my private collection of plants. Selections by the others were of the same character, being almost entirely articles of clothing, tobacco, etc. As commanding officer I took in addition my epaulets, sword, etc., and at Lieutenant Lockwood's request carried for him a favorite revolver, as he wore another which he had invariably carried in the field.

The pendulum, first secured in its box, was afterward soldered

in a tin case, and later secured against harm from rough handling by a wooden covering, which raised its weight to nearly a hundred pounds. The most valuable thermometers were carefully secured in a strong wooden case, and the magnets were transported on the person. Four rifles, with about a thousand rounds of cartridges, and two shot-guns, with ample ammunition, were also selected.

The greater part of the men turned in their private diaries, sealed and addressed, which, with forty-eight photographic negatives, were carefully packed in a stout water-tight box. Medical stores designated by Dr. Pavy were handily arranged by Hospital Steward Biederbick, on whom that duty fell. The medical liquors were also taken in as great a quantity as I felt was possible.

In addition to my own baggage, I also carried needles, bodkins, gimlets, thread, yarn, etc., not only for trade with the Etah Eskimos, if we should reach them, but for our own use. A large assortment of tools of various kinds, and material for repairing boats were also selected, and the outfit of the boats was made as complete as our means would permit. Our complete sledging-gear, which had answered so admirably in the field, was adopted for the retreat, and alcohol for fuel was taken in quite large quantities.

All these and other arrangements were perfected, but still the ice would not open. July ended in southerly gales, which did much toward breaking up the last year's floe in Hall Basin and Robeson Channel. Unfortunately Kennedy Channel did not break up until July 24th, one day after the *Proteus* sank. Discovery Harbor broke up July 30th, so that it was navigable at times in the southern portion. Time pressed, our fresh meat and vegetables were gone, our fuel nearly exhausted, and everything in an unsettled condition.

It was not, however, a question as to whether I should be obliged, contrary to instructions and expectation, to remain a third winter at Conger. It was true that Archer Fiord yet remained closed, the continuity of its ice broken only by occasional water-pools, but the supplies accumulated on its southern shore in the preceding spring now rendered it possible for me to abandon my steam launch, and with sloops and small boats cross floe and water to Cape Baird. In this frame of mind we impatiently waited for August 8th as the turning-point in our fortunes, when we were to go by vessel or by boat.

The health and condition of the party at that time was extraordinary. But two men, both of whom are now living, were in any way in a state which would prevent active field work. This condition appeared the more remarkable, when I reflected on the past. We had experienced two years of unequalled cold and darkness. Nine months (less twelve days) had been marked by the total absence of the sun, during which the *mean* temperature had been -31.4° (-35.2° C.).

The amount of work done was equally extraordinary. The sun had shone four hundred and fifty-three days, and on two hundred and sixty-two days from one to three sledge parties had been in the field on journeys entailing from two to sixty days' absence and three thousand miles of travel.

Our explorations covered $3\frac{1}{2}^{\circ}$ of latitude and 45° of longitude, one-eighth of the way around the globe above the 80th parallel.

To the northward a latitude never before attained on land or sea had been reached, and for the first time in three centuries England yielded to another nation the honors of the "Farthest North." The end of Greenland, so many times seen, or supposed to have been, was extended at least forty miles northward, and over a hundred miles of new shore, never before trodden by the foot of man, added to its coast-lines.

To the westward the Polar Ocean had been reached by the crossing of Grinnell Land, while the interior of that country had been surveyed, its extraordinary physical geography determined, and the outlines of its northwestern coast fixed with tolerable certainty.

The programme of scientific observations, the main work of the party, had been carried out as far as instruments and means permitted, and in the two years over five hundred observations were made and recorded daily.

The monotony of Arctic life, the depression of months of cold and darkness, the restricted and limited diet, the dangers and extreme privations of winter and spring sledging, had all been experienced without scurvy, without loss of health or limb, without sickness, and without even a serious frost-bite.

This experience proves the possibility of a selected party, under proper management, to endure for a series of years the danger and privation incident to Arctic life and explorations with safety and comparative comfort. The later sufferings and death are properly chargeable, first, to the fortunes of navigation, and afterward to preventable causes.



The Snow-bunting.

CHAPTER XXIX.

FROM CONGER TO CAPE BAIRD.

AUGUST 8th came, the day set for our retreat. The condition of affairs is set forth in my journal, from which I shall frequently quote in describing the retreat by boats and our subsequent experiences at Cape Sabine :

“On this day we were to have abandoned this station, but no chance of leaving has yet presented itself. The strong southerly gale, is making water fast, and should clear Archer Fiord. My own observations show that Kennedy Channel is quite clear of ice, as well as the eastern part of Hall Basin. Varying favorable reports have been made by the watch sergeants, up to the present (midnight), but at no time has there been a living chance of the launch crossing the fiord. The entire party are under orders to be ready to leave at an hour's notice.”

August 9th.—“Early reports this morning unfavorable, but improved later, and at 10 A.M. I ordered the formal abandonment of the station at 1 P.M., hoping to leave by 2 P.M., when an ebbing tide setting ice northward, will favor our passage.”

The last scientific observation was made at 1 P.M., by Sergeant Jewell, who, with Brainard and Long, were left at the station while the launch was being loaded at Dutch Island. Brainard, by my orders, opened several barrels each of seal-blubber, pork, beef, and bread, so that the dogs could maintain life for several months. I regretted exceedingly to leave those faithful animals, to whom we were strongly attached, but they could be of

no use in our retreat. I could not safely kill them, for in case of our return to Conger, through any contingency, they would be essential to us for hauling in our game and fuel.

Three tons of coal remained, which, with our valuable collections and the greater part of the remaining food, were fully protected against the weather by being stored in the house and porches. We abandoned a sufficient quantity of salt meats, hard bread, coffee, tea, and several other articles for a scant year's army rations, not enough for an Arctic ration. Flour, sugar, vegetables, milk, and butter, were entirely gone or remained in very small quantities.

At 2 P.M. the chances of crossing Archer Fiord, if we could once reach open water, were exceedingly favorable and every moment improving. Unfortunately, a belt of heavy closely-packed ice, too dangerous for the launch, had remained crowded against the mouth of the harbor from Dutch Island to Bellot Island, which obliged me to run out by the westward passage.

Leaving Lieutenant Lockwood to complete the loading, I ordered him to join me at Proteus Point, where I proceeded to examine the condition of the ice in Discovery Harbor toward Sun Peninsula. From Proteus Point the preconcerted signal was given to Brainard, Jewell, and Long, who joined me from the station at 3 P.M., with the half-cooked dinner, just as the launch came up with two boats in tow.

We started immediately, with excellent prospects for reaching Sun Peninsula without trouble. The tide was flood, the wind quite brisk from the south, and the indications were that we would reach the western entrance at a stage of the tide just before the ebb, when the fiord would be well cleared of ice.

Unfortunately the deeply-loaded launch and boats made slow progress, and by the time the north side of Bellot Island was reached the water was too low to permit of following the ice-

foot. It was a question as to whether our coal and energies should be expended in advancing. Lieutenant Lockwood was left in charge with instructions to push on, and I proceeded to high land on the island, and saw such favorable conditions as justified all exertions. After seven hours of constant and persistent labor through rough and heavy ice, we reached Sun Peninsula.

Leaving the party preparing some warm food, I went with Sergeant Brainard to a summit overlooking Archer Fiord, where it was evident that a mile further would put us into clear water, which extended to Cape Baird. In the meantime some food had been eaten and several geese killed.

Owing to shallow water we were delayed somewhat in getting into the fiord, and by that time the tide was about flowing. We pushed on, however, and were soon within several hundred yards of clear water, when I quit the launch for a minute to examine the prospects of a lead some fifty yards ahead, which could not be seen from the launch owing to intervening heavy ice. The whole body of ice had commenced moving southward toward the head of the fiord, and the launch not being turned back quick enough, was nipped between two floes of last year's growth. She was caught by the ice in such manner that she came near being thrown on her beam-ends, but was in no great danger of being directly crushed. About a dozen of the party held her as upright as possible, while others quickly transferred to the ice the provisions, coal, etc.

The other boats were drawn up on the floe to await further movements of the ice. By watching and waiting as the ice slowly moved, the launch was gradually worked into a natural dock where she was in a safe condition.

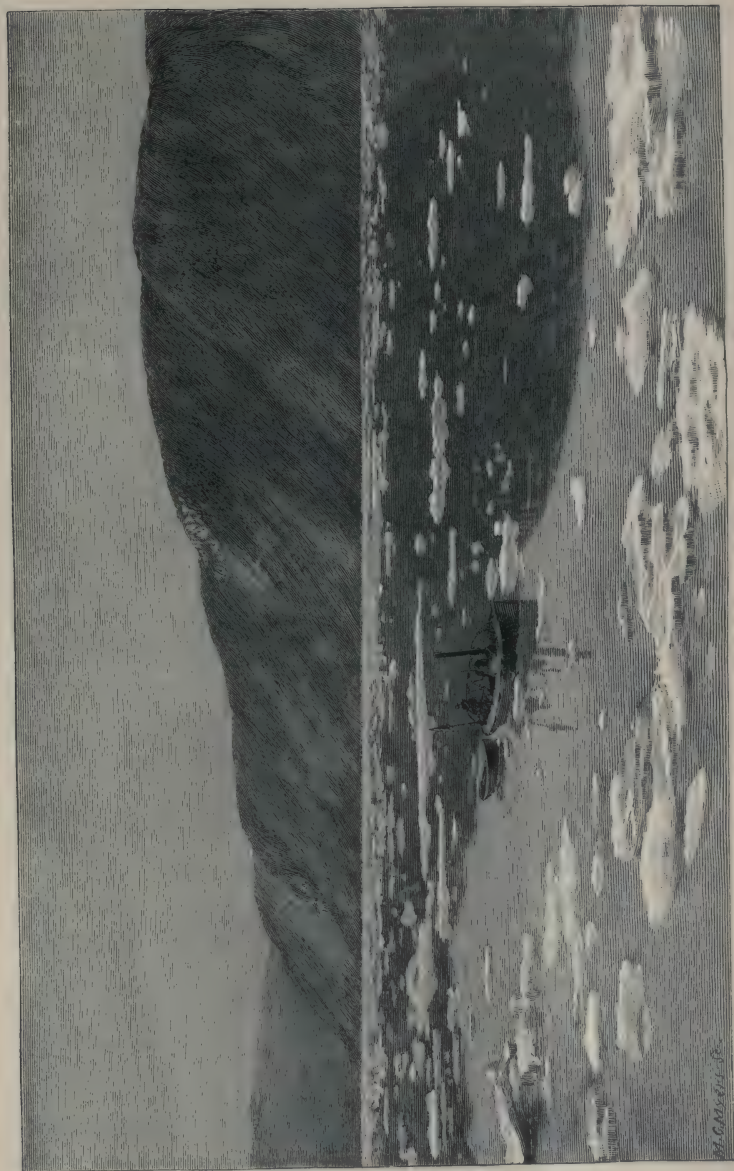
This was our first nip, and at the time it appeared to us a serious and important one; but later more dangerous experi-

ences in a moving-pack relegated it to a minor place among the dangers of our retreat. The staunchness and strength of the launch here displayed gave me renewed confidence in her, and caused me afterward to place full reliance in her when dangerous attempts were called for.

As the boats were safe and the ice too close for further movements, the men, save a sentinel, were sent to their sleeping-bags for the rest they sadly needed. It was now 3 A. M., and for the first time in twenty hours I was able to spare time for food and to take an hour or so of needed sleep.

About 9 A. M., August 10th, at the turn of the tide the ice loosened somewhat, and after a careful examination of the ice we proceeded, and running southward into Archer's Fiord, succeeded in passing around the heavy ice-fields which separated us from Cape Baird. We reached that point at two o'clock, experiencing during our passage a heavy gale, which continuing, rendered it impossible for us to proceed southward into Kennedy Channel. Our time at Baird was occupied in putting everything in readiness for a move at the earliest possible moment. A cairn was erected, in which was deposited a record stating that the party of twenty-five, all well, proposed to leave for Littleton Island, and perhaps later Cary Islands, that night. At this early stage of our retreat I felt constrained to face the contingency of accident or disaster to the relief vessel. In addition, I left maps showing the extent of our explorations and a notice for any visiting vessel, which stated that our *original* records and the entire collection of natural history specimens were to be found carefully packed in the building at Conger, ready for instant shipment.

I left Lieutenant Lockwood, with instructions to get everything in order, while I visited the high plateau just to the southward of Cape Baird, which afforded an excellent view of



LAUNCH LADY GREELY IN DISCOVERY HARBOR, AUGUST, 1883.

(From a photograph.)

M. C. McVey

the straits. A high southerly gale prevailed, which had driven the greater part of the ice into the northern half of Hall Basin, where it generally consisted of enormous palæocrystic floes separated by occasional pools of water. Toward Discovery Harbor an outlying dense pack was visible, which proved the impossibility of crossing Archer Fiord in any other manner than by our own route—a detour to the southward. To the southward, in Kennedy Channel, the prospects seemed excellent, if we could but get the start of the ice to the northward. The only signs of previous visits by man was the small cairn erected by Beaumont, seven years before, almost to a day, after his extraordinary crossing of Hall Basin with his scurvy-stricken crew.

I returned to the party, which was comfortably encamped at the mouth of a small river where in ages past the hardy Eskimos had likewise pitched their tents. In the immediate vicinity of this spot Sergeant Brainard had discovered the ancient Eskimo sledge, ancient stone lamp (see preceding illustrations), and other interesting relics of these nomads of the north. As the gale still held the party were sent to their sleeping-bags, while I definitely perfected further arrangements for our retreat. Our means of transportation consisted of the twenty-seven foot navy launch, the *Lady Greely*, which afforded the motive power for our other boats, which were towed by it. Lieutenant Lockwood was especially put in charge of her, with a crew of six, including engineer and fireman, which, with Lieutenant Kislingbury and myself, raised the number to nine. The remaining sixteen of the party were divided between the three boats in tow; in one of which, the whaleboat, Dr. Pavy went by preference. In case the launch should be suddenly lost an assignment of the party of twenty-five had been made, so as to avoid all possible confusion. In that contingency the whale-

boat (Narwhal) was to be commanded by me, with a crew of eight; the English ice-boat (Beaumont) by Lieutenant Lockwood, with a crew of seven; and the jolly-boat (Valorous) by Sergeant Brainard, with a crew of seven. The assignments were so made that the seafaring men of the party were equally distributed. To provide against disaster to any of the boats, the records, provisions, coal, etc., were as generally distributed as was possible. Thirty-nine bags of coal, aggregating fifty-five hundred and sixteen pounds, were taken as fuel, of which about four hundred pounds were carried in each of the small boats and the same amount in a fourth boat, a small Whitehall, which was taken along for general work as a single man could handle her anywhere in thick ice.

We had over forty days' full rations, with rations for over twenty days cached to the southward of us between Capes Baird and Collinson, which I calculated (and, as it proved, accurately) would enable us to reach Cape Hawks with the same amount of supplies as on leaving Cape Baird. Considering the possibility of our passing southward of Littleton Island into the open north water, a complete suit of canvas for all the boats was taken. This was probably one of the few errors of the retreat, but, if so, it was fallen into by me with a full knowledge of the situation. No one knew better than myself that, in nearly two months' work to the northward of Cape Sabine, the British expedition of 1875-76 had spread canvas but twice. While I realized correctly that canvas never could be used by us until Littleton Island was reached, yet I should not have forgiven myself, even had naval authorities condoned the fault, had I reached open water and been without canvas.

That we were able to leave Cape Baird so thoroughly fitted out was the result of forethought and precision in accumulating these supplies the previous spring.

The gale showed signs of abating about 9 P.M., when supper was prepared and the boats hurriedly loaded. The Valorous, Beaumont, and Narwhal, in the order named, strung out as a tail to the launch, the tow-line of each boat being attached to the stern of the preceding one. The tow-line was in charge of a reliable man in each boat, and could be cast off instantly.

Emerging from the mouth of the river, we steamed slowly along past the row of beautiful stranded floebergs which lined the shores of Cape Baird, keeping, however, a safe distance from these uncertain sentinels, which were liable at any moment to topple and fall seaward. We touched at the extreme point of Cape Baird to take up a final cache of bread. As the midnight sun struggled through the distorted masses of angry clouds we turned our prows into Kennedy Channel—to the southward, and, we hoped, to safety.

We then knew not that one relief steamer was at the bottom of the sea, and that its consort, its commander "convinced that this frozen region is not to be trifled with," was that very day steaming safely southward, with undiminished stores, into the harbor of Upernivik.

And so we turned homeward, knowing we had the courage to face the blinding gale, the heavy floes, the grinding pack, the countless other dangers which environ the Arctic navigator; and having also, though we knew it not, heart and courage to encounter uncomplainingly, on barren crags, the hardships and horrors of an Arctic winter, with scant food, shelter, and clothing, with neither fire, light, nor warmth, and to face undauntedly intense cold and bitter frost, disaster and slow starvation, insanity and death.

CHAPTER XXX.

KENNEDY CHANNEL.

A T first open water quite free from ice appeared, which offered an uninterrupted course and caused many hopeful expressions as to an easy journey, but to one familiar with ice navigation no mile is counted good until it has been passed.

The wind had changed to the northeast, and the heavy floes, drifting rapidly southward and crowding against the west shore, cut us off from open water and drove us to a safe harbor in a break of the ice-foot about half way between Capes Lieber and Craycroft. The palæocrystic floe which impinged on the shore was perhaps the largest seen by us. It was about fifteen miles long, as my field diary states, and several miles in width. Very possibly it was the floe over which, between Capes Beechy and Sumner, sledge parties the previous spring could not cross in a day's march.

Fog and light snow set in, which soon wet everything unprotected by canvas. The men, glad to quit the cramped position necessitated by our crowded boat, were soon asleep under the improvised tents on the narrow beach between the ice-foot and precipitous crags which form the coast-line.

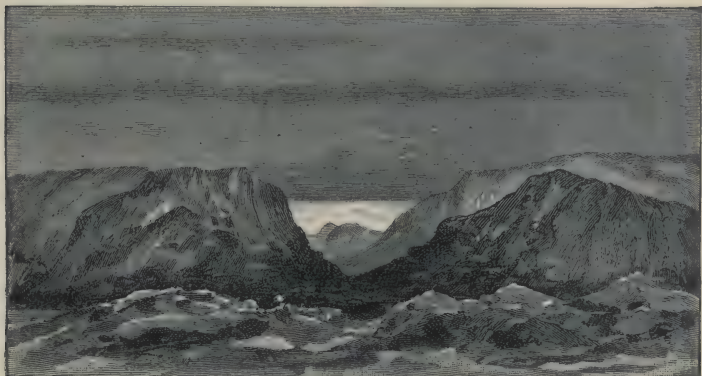
About 7 A.M., August 11th, the watch-sergeant informed me that snow had ceased to fall and the ice was moving. I immediately climbed a projecting spur of the high cliffs to the southward, leaving orders with Lieutenant Lockwood to proceed southward and pick me up if I should so indicate. From the hill I



NORTH SIDE OF CARL RITTER BAY, KENNEDY CHANNEL.

(From a photograph.)

could see that we were separated from open water by a belt of quite heavy closely-packed ice of a mile in width. I at once gave the signal to advance. The cooks had commenced the preparation of breakfast, and the rest of the men had been called for the possible movement. Everything was speedily on board the launch, but still she did not move forward for some minutes, during which I impatiently watched the widening belt that threatened to cut us off from the open water, and through which we forced our way with difficulty.



Bessels Bay from Cape Cracroft.

[From sketch by Sergeant Gardiner.]

Two hours brought us to Cape Craycroft, where I had cached a hundred pounds of meat and a barrel of bread, the preceding year. The shore-belt of ice at that point was loose, but heavy and in motion, so that it was dangerous to venture in with launch and tow. The prospects to the south were so excellent that I doubted the propriety of either a long delay or the endangering of the boat, so I sent in the Whitehall boat with two men, who brought off the meat.

Kennedy Channel to the Greenland shore was free from ice, and to the eastward Bessels Bay, a long narrow opening with

its cliffs striped with the great inland ice-cap, was clearly visible.

Shortly after this we saw five narwhals, which was a most encouraging sign as to the open condition of Kane Sea, for the northern range of the narwhal is without doubt coincident with the extreme extension of the free "north water." Two dovekies were shot and picked up without stopping the launch.

We passed Cape Defosse at noon, only to meet with a heavy fog. The truth of Sir John Franklin's remark as to the great extent to which fog enhances the dangers of boat navigation was now exemplified. The launch was slowed down to half speed, for frequent palæocrystic floes made it dangerous to run at full speed. Later we observed many grounded floebergs, and found a shallow bar which extended out from shore for a mile or two. During this time, and later, when running in a fog, we kept a couple of the horns in service, with which we hoped to notify any passing vessel of our presence.

After dodging around the numerous floebergs, and having nearly grounded in the shallow water several times, I concluded to save coal and avoid such danger by seeking land, where we remained several hours on a low sandy fore-shore. Here a meal was cooked, and a few hours later, as the fog cleared, we started southward, at 6 P.M.

Fog and ice were again troublesome, and about midnight, as we had reached a safe anchorage and the weather was yet thick, we stopped and camped. A summer torrent had worn its way through the massive ice-foot, which at low tide rose from eight to ten feet above the boats, so that all were safely harbored. The boats were hauled up on shore, and the launch anchored in a cove and left in charge of the engineer, who said he had some work to do and preferred to look after her for that watch.

I rose at 7 A.M., August 12th, after only two hours' sleep, and

found that the bow of the launch had been allowed to ground on the falling tide. This contingency had been provided for by the detail of a man to assist the engineer. It was an exceedingly serious matter to lose a tide at that point, as it must necessarily entail eight or ten hours' delay. Without losing time to investigate the cause, I immediately set the whole party at work to free the launch. At this juncture special orders, which were given to Sergeant Cross, the engineer, were not obeyed until I most emphatically reiterated them, when the man emerged from under the launch covering and showed himself to be under the influence of liquor. We finally succeeded in getting the launch into such position that we lost only two hours by the neglect. It was evident that Cross had availed himself of the opportunity afforded by the party being asleep to appropriate some of the fuel alcohol. He had been guilty of similar conduct on previous occasions, but had promised reformation. Occupying, as he did, the responsible and important position of engineer, his unwarrantable breach of discipline at such a dangerous crisis evidenced an intention on his part to presume upon his then indispensable services, which augured ill for future good behavior and reliability. To replace him by an untried man in the middle of such a perilous voyage seemed a greater risk than to retain him with a vigorous reprimand. My field journal appropriately says: "It is difficult to determine what is the best course to pursue with such a man, who, relying upon his position, thus tampers with the safety of the entire party."

We got away at 9.30 on August 12th, and stopped, after a difficult run of several hours, on the north side of Cape Back, just south of the 81st parallel. We were obliged to follow the ice-foot quite closely, owing to the foggy weather and the large amount of moving ice in Kennedy Channel. The run

was made through loose streams of heavy ice, which demanded constant watchfulness and prompt action to avoid disaster, if not destruction. Orders given to the engineer were badly executed during this time, which augmented our danger and several times resulted in the nipping of the boats. On two occasions the boats were cast off from the launch and drawn up on heavy floes. At 2 P.M. I stopped a few moments to examine the ice from an adjacent cliff, and, finding the route somewhat more open, sent the engineer to bed and replaced him by Private Frederick, who had on occasion been charged with the duties of engineer. Under his management our progress was much more satisfactory. Snow setting in, and the weather becoming very thick, I sought a safe break in the ice-foot, which proved to be near Cape Back. This was the first time since we had left Cape Defosse that we were assured of our exact locality, as the thick weather had prevented observations or any extended view.

The weather cleared somewhat a few hours later, and the first fine run was made. Cross, having recovered himself, was again in charge of the engine; Frederick being worn out with his long tour of duty, first as fireman and then as engineer. The cache on the north side of Carl Ritter Bay, made by me in 1881 on our way to Conger, was visited, and its two hundred rations taken up.

On leaving the cache I decided to run direct for Cape von Buch, although Lieutenant Kislingbury urged strongly that I follow the coast-line closely along the whole extent of Carl Ritter Bay. The run was made successfully, touching but a single belt of ice and avoiding large masses of shore ice, which, under the influence of the ebbing tide, was moving out of the southwest part of Carl Ritter Bay, and would have obstructed a circuitous shore passage. To the southward of Cape von

But open water, with only sailing ice, was found until ten miles southward, at 2 A.M., August 13th, farther progress was rendered impossible.

We came to what was apparently an unbroken pack of immense palæocrystic floes of great thickness. A mile from shore an enormous floeberg, which reached some sixty feet above the water, had grounded, and from this to the shore extended a single unbroken floe. We were fortunate in obtaining an unusually well-protected harbor at the mouth of a ravine, where the broken, wasted ice-foot permitted the small boats to be hauled inside, while the launch was entirely safe except at extreme low tide. Snowy weather then prevailed, which dampened the clothing of the men and rendered their cramped positions in the boats intolerable, while the strong southerly gale and low temperatures chilled every one to the bone. For the first time I deemed it advisable to issue an allowance of rum. The formation of the shore at this point was very steep cliffs, which were only separated from the ice-foot by a sloping talus of disintegrated rock, on which the party arranged themselves for sleep under circumstances which afforded comfort only as a change of evils.

At 8 A.M. a warm breakfast was served, after which Lieutenant Lockwood with Jens visited a cliff about two miles to the southward, from which the shore could be seen a mile farther. He reported nothing but ice, with no possible chance of advance, and expressed his opinion that the pack to the southward had not broken during the summer.

The condition of the ice above precluded this idea, and after the turn of the tide I sent the watch (Sergeant Brainard), with the small boat, to examine the floeberg and ascertain our chances of passing it. On his return he reported it to be the key of the situation, and that only a slight change in the ice was

necessary to permit us to pass to the southward of it into a narrow lead of water which extended southward to the next cape.

A second trip revealed a mere possibility of passing to the southward, and everything being in readiness we moved to the floeberg. The passage hoped for was just too small to admit of the launch, but on farther examination we found that the floeberg, which seemed whole from shore, had, since grounding, split and separated. The narrow cleft presented to our view afforded perhaps the most wonderful passage ever traversed by any voyagers. Scarcely a dozen feet wide, it was over a hundred yards long, and its perpendicular walls of opaque ice on each side reached full fifty feet skyward above our passing boats. I recall no other weird mass which has so impressed me with the grandeur and scope of nature's forces and works. Its slow growth had probably required a thousand years before the falling snows of the Arctic sky, accumulating, flake by flake, on the plateaus of a glacial continent, had attained such weight and thickness as changed it to ice. Later, through ages, this huge bulk, slowly moving seaward, broke from its parent mass in the Polar Ocean, and in the past years had floated southward and stranded here. Its million cubic feet of ice might well be thought impenetrable and capable of infinite resistance, yet the stress and motion of countless smaller floes had broken it as though it were a bit of chalk.

A short run brought us to the northeast point of a curve in the coast, a bight which was hardly deep enough to be called a bay. To the southeast the ice was close, dense, and impenetrable. The wind commenced to blow hard, heavy snow fell, and the prospects were dismal and discouraging. There was no protection for the launch, for the ice-foot as we travelled south was growing higher and higher, and was now from ten to twelve



A WONDERFUL LEAD THROUGH A SPLIT FLOEBERG.

feet above the boats. At one place was a slight break, where in extremity a small boat could be hauled up.

It was noon, and all were sent to their bags except the watch. I could not sleep, however, and remained up observing closely the changing ice conditions, while the men, wet and chilled, got what rest they could. The sail we had was needed to protect the bread against the snow, and the men sacrificed willingly their own comfort to secure the provisions. By 2 p.m. affairs looked desperate, for the heavy ice, which, under this strong southwest wind and ebbing tide, was moving rapidly northward a few hundred yards out, showed ominous signs, as the low water came, of closing in upon us. In the meantime I had carefully examined the ice to the southward, and determined the moment the tide turned and the ice loosened I would push down the bight along shore, and, finding secure anchorage at the southern entrance, await favorable weather to get farther south.

The question was, would the ice hold off that long, or would it close in and grind us to powder, save such boats as we could haul up. I kept one of the watch on the hill, with orders to advise me the instant any signs of the pack loosening should be noted. With the other man I kept a close eye on the pack, for I was reluctant to rout out the men, whose wretchedness and discomfort were already sufficiently great.

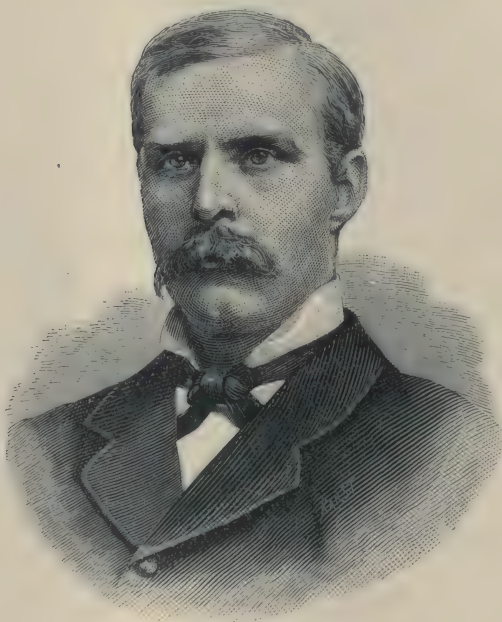
The tide turned a few minutes after two o'clock, but the southwest wind held the ice well up until the tide was in its full flow, about 4.30 p.m., when, as affairs were reaching their worst, I was much relieved by Whisler announcing from the hill that a lead was opening into the bay. It was none too soon, for the same stage of the tide that was clearing the bay brought down on us the entire pack.

Everything was ready for instant movement, but even as we started we were caught in heavy ice, which handled us very

roughly. In a few moments we were safe in the bay, when the struggle of crossing it commenced. By tremendous exertions, and, by taking serious chances, we succeeded, by 7 P.M., in reaching a point within a quarter of a mile of the southern cape. We were checked, however, by the wind, which, changing to southeasterly, crowded the whole pack against the shore, and rendered farther progress impracticable. We were perfectly safe, however, as the bay was shallow and fully a hundred floebergs were stranded, which relieved us from any direct pressure. In crossing the bay a small seal was shot, by Lieutenant Kislingbury, I think, which was cooked for supper; the men, with but one or two exceptions, eating it with relish. During this run Sergeant Cross was repeatedly guilty of mutinous, insubordinate, and disrespectful language, none of which was directly addressed to me. He appeared to take pains to make everything go wrong with the engine, and obeyed orders only when repeated. His services as engineer at that time being necessary, I reprimanded him twice most severely.

A northeast wind prevailed during the night, driving the pack rapidly to the southwest. At 8 A.M., on August 14th, Kennedy Channel seemed clear to the north. To the south only occasional lanes of water could be seen; elsewhere a vast expanse of heavy, crowded ice, too heavy even for a vessel. My journal says: "Latitude $80^{\circ} 44'$ N., 4 P.M. The ice has been watched very carefully and anxiously all day. Occasional gleams of hope sprang up as the wind lulled and went to the south-southwest, only to spring up with greater force from the northeast. Clear weather at times gave us a fine view of Hans, Franklin and Crozier islands, as well as of the Greenland coast from Morris Bay northward. I do not wonder that Morton could not scale Cape Constitution, if it is as steep as it appears—a sheer naked wall of rock. Ralston shot a knot and

Ellis a turnstone, the only birds lately seen. Lieutenant Kislingbury, with Christiansen, went hunting in the interior last night. He reports a narrow desolate valley, with no vegetation, running at right angles to the coast for a mile or two, and then trending northeast parallel with Kennedy Channel. They went five miles up the valley, saw two small lakes, and observed



Lieutenant F. F. Kislingbury.
[From a photograph.]

a depression beyond that betokened a large lake. These lakes were yet covered in the centre with last winter's ice, which indicates that they are permanent. They were fed and connected by a small stream which, probably springing from a glacier, discharges into Kennedy Channel near our camp." On the principle of associating his name with his own work, I have affixed

Lieutenant Kislingbury's name to the valley and river, instead of placing it elsewhere.

"August 15th.—The temperature sank last night to 21° (-6.1° C.), and new ice formed to the thickness of an inch and a half. This cold weather caused me such uneasiness that I slept but little. About 9 A.M. I determined to get the launch off shore, and as near the moving ice as was consistent with safety, fearing that otherwise new ice forming so fast would imprison us, and oblige its abandonment. With great difficulty we managed, by 3.30 P.M., to get the launch within four hundred yards of the moving ice, in a harbor where she was completely protected by grounded floebergs. While we were getting her out, Cross, the engineer, used insolent and insubordinate language again. Everything went wrong in the engine-room. My orders were neglected, or ignored until repeated, although their prompt execution was especially important. Finally, an order not being obeyed on its emphatic repetition, Sergeant Brainard reported that Cross was intoxicated. I went to the engine-room, saw that he was drunk, and at once relieved him, sending him ashore and ordering him not to enter the launch again except by special authority. I put Private Frederick in charge of the engine, with orders not to permit Cross anywhere near it. A man who has so misconducted himself in such critical circumstances cannot be trusted in any way. It is evident that he became intoxicated on our fuel alcohol, some of which he must have stolen and concealed several days since, as the supply has been kept out of his reach since his last intoxication. It is impossible to watch the alcohol cans constantly, and they must be kept at hand now for cooking purposes.

"Lieutenant Lockwood, in the course of the evening, got the boats within one hundred and fifty yards of the launch, in a place perfectly protected by grounded bergs. Unless the ice

changes materially, we shall be able to leave this point without difficulty as soon as the strong northeasterly wind dies away. The temperature has remained below the freezing point (0° C.) all day, and now (12 P.M.) stands at 26° (-3.3° C.). Brainard asked permission to go to Cape Lawrence to see if there was any vessel in Rawlings Bay, as many thought. I told him it was unadvisable to separate the party for such a distance."

"August 16th.—Still detained by a strong northeasterly gale, which keeps the channel jammed with ice; but few pools of water have been visible to-day. The dense mass of ice moves steadily southward, though with diminished velocity during the ebbing tide. It is fortunate that I decided to move yesterday to our present position, as the low temperature has made new ice so rapidly that nothing could have been done to-day. The men are uncomfortable, and there is some complaint that we left the shore, but such action is our only chance of escape. A high north wind, which has prevailed all day, with temperature ranging from 26° (-3.3° C.) to 28.9° (-1.7° C.), has chilled and benumbed every one. Rum has been issued, a half gill to each man, in consequence."

"August 17th.—Still ice-bound in the same place, $80^{\circ} 44'$ N., 68° W. Three inches of snow fell during the night, occasioning much discomfort to all; but now, 8 A.M., the sky is clear and the wind light, so that the men's spirits have much improved. From the grounded bergs, twenty feet high, no water can be seen in any direction. Ellis and the Eskimos went ashore last evening, and saw a belt of water five miles wide along the Greenland shore. If a southwest gale should spring up it would set us free immediately. The temperature sank to 23.2° (-4.9° C.), the lowest temperature, I think, ever observed thus early in August. The ice is increasing rapidly in thickness, and unless the channel soon clears we shall be obliged to aban-

don our launch. Such a course precludes the possibility of returning to Conger by boat. Our course has been so circuitous, owing to unfavorable ice conditions, that we have been obliged to travel over two hundred miles to make these sixty miles of latitude. We are burning eighty pounds of coal daily on the launch, keeping her fires banked."

"August 18th.—Still ice-bound at 2 P.M. The boats have been sheltered under stranded floebergs two hundred yards nearer the moving pack than the launch; I moved the latter this morning as close to the boats as could be done without losing distance from open water, which now is to be seen in broad lanes. The temperature was down to 24° (-4.4° C.), and has touched 32° (0° C.) only two hours during the past four days. The young ice has rapidly increased in thickness, cementing into one mass the old floes, and rendering movement in any direction very difficult.

"Evening.—At 3 P.M. the floeberg to which the small boats are anchored, suddenly split in two pieces. It caused much alarm and commotion, but did no harm. I decided to make a desperate attempt to force and cut a way through the solid pack, and place the launch in the first lead possible. It was a perilous plan, which no one thought could succeed. Nearly two hours' hard work accomplished little, save to lose an axe and thoroughly discourage the men. As soon as supper was over, despite some covert criticism, I renewed the attempt, sending Sergeant Brainard in the meantime to examine the ice to the southward, where he found it hopeless.

"Four hours' cutting, charging, rolling, etc., worked wonders, and, as the result of our exhaustive labors, the launch was got to open water a few minutes since (10.30 P.M.), where I am impatiently awaiting the small boats to push forward into the open water to the southward before the tide commences to

ebb. The temperature remains steady at 29° (-1.7° C.), with light snow.

"We started again at 11 p.m., all much relieved to be once more in action. I unfortunately fell overboard this morning. I had been on the bow directing the course of the launch through sailing ice, and on reaching open water started back to the engine-room. The spars, covered with light snow, afforded an indifferent foothold at best, but my wet Eskimo boots took no hold and a slight lurch sent me overboard. As I came up Lieutenants Lockwood and Kislingbury caught me and pulled me on board."

We had a fine run of four and half hours, when we were forced to a secure harbor about eleven miles north of Cape Lawrence, between some huge stranded floebergs. We gained harbor just in time. Sergeant Brainard's diary says: "The tide, having changed, came charging down on our frail boats with the speed of a race-horse, and we barely escaped to a small harbor, which was protected by grounded floebergs. I never saw ice move with greater rapidity. Within two minutes of the time we left the open strait its surface was a whirling, turbulent mass of heavy ice, which would have ground our boats to atoms."

"The tides at that point are very heavy, evidently from twelve to fifteen feet in the spring. A lead showing up, we had a run of two hours this afternoon, and just missed reaching Cape Lawrence. As the tide turned, a strip of pack-ice about a mile wide separated us from open water to the south. We made a bold push, but the lead closed on us, and we were forced a couple of miles northward, and obliged to seek instant shelter. A few hundred yards from shore the engine blew out a piece of packing, and we had to tow the launch in by boats, reaching the ice-foot in the nick of time, just as the ebbing tide was moving

the ice rapidly to the north. Later we ran along the shore an hour, but, meeting sludge-ice closely packed, concluded that it cost too much coal, so made the shore seven miles to the northward of Cape Lawrence."

"August 19th.—Private Frederick reports that the engine was in exceedingly bad condition when he took charge. He has been devoting every spare moment to setting matters right, and now reports everything in excellent working order, though not in perfect condition for lack of tools and material. Sergeant Brainard and Eskimo Frederik have just been sent (8.45 P.M.) to Cape Lawrence to observe and report upon the condition of the ice to the south. If we move with next tide (the ice is now densely packed), we shall follow the ice-foot and pick them up. They were accompanied by Dr. Pavy, who requested permission to go. The Psalms for the day were read previous to their departure."

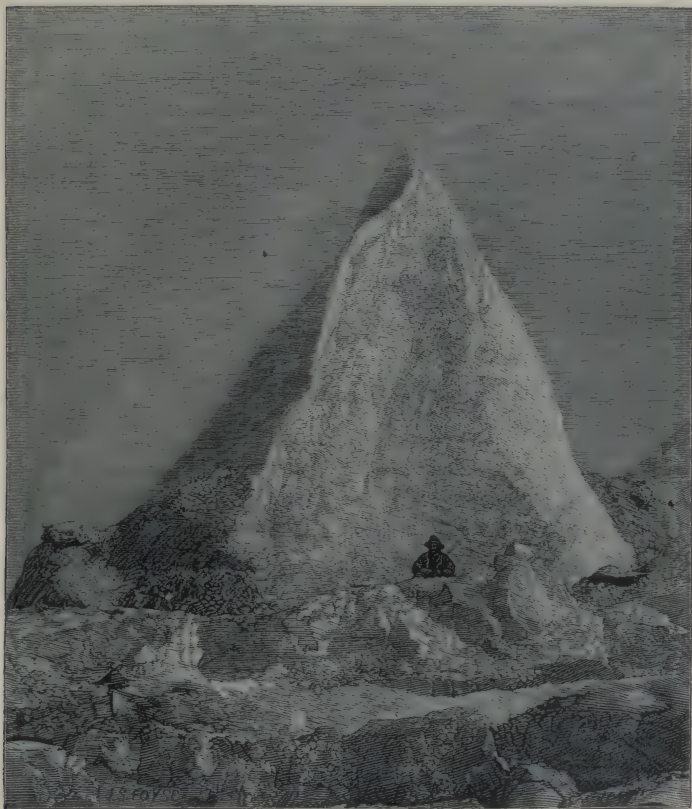
"August 20th.—A lead showing up, we started at 4 A.M. Strong southwest winds prevailed, which retarded our progress, but cleared the ice from the coast. Dr. Pavy and Sergeant Brainard were picked up about three miles north of Cape Lawrence. Their report was most discouraging. From the summit of Cape Lawrence they observed an impenetrable pack, extending from Cape Lawrence across Kennedy Channel to Cape Jackson, with no water in sight. They had very little confidence in our chances of getting south for some time. On this report I sought a secure harbor between two grounded bergs, a mile from Cape Lawrence, and directed breakfast to be prepared. In the meantime I proceeded to Cape Lawrence, and from an elevation of two hundred feet saw broad lanes of water to the southeast and south, the heaviest ice being in Rawlings Bay. This experience confirmed me in my previous opinion, that ice conditions cannot be foretold for any length of time,

but depend almost entirely, at this season of the year, on the action of the wind and tides.

"I returned in haste to the launch, and immediately started, but stopped in Rawlings Bay, half way between Cape Lawrence and Radmore Harbor, on account of the dense fog, which, with the rapid adverse tide, made advance dangerous.

"A massive perpendicular ice-foot twelve feet high extended along the shore, on which we drew out the Valorous for slight repairs. The fog showing signs of breaking, I walked up the north side of Rawlings Bay to the point overlooking Radmore Harbor, and from a considerable elevation saw an immense palæocrystic floe of many miles extent moving out of the bay, leaving clear water behind it from that point to Cape Joseph Good. I hastened back to the launch to find her just grounded, although stringent orders had been given to keep her clear, and two men had been detailed for that special purpose. The strength of the entire party was inadequate to get her clear, and she is now high and dry awaiting the next tide. High water at 12 M., and low water at 6.13 P.M. The range of this tide was nearly fourteen feet. In this bay, I believe, the Alert was caught by a similar tide, in 1876, and was pushed ashore by a floe. It was owing to my recollection of that event, and our own experience a few days since, that I had given such stringent orders regarding the boat. The chance of crossing a bay of this extent does not present itself at every tide. The watch sergeants, however, claimed that the strong tide, which was ebbing an inch a minute when the launch grounded, rendered futile their efforts to keep the launch out from the ice-foot, and other help was called too late. An ivory gull, several seals, a fox, and the dung of musk-oxen (the latter very old) were seen by me near by. Vegetation along Rawlings Bay is quite luxuriant for the latitude, and resembles very closely that around Discovery Harbor."

North of Cape Lawrence Sergeant Brainard found the skeleton of a young reindeer. Christiansen said the animal could not have been dead more than two years. Near the cape



Pyramid Floeberg.

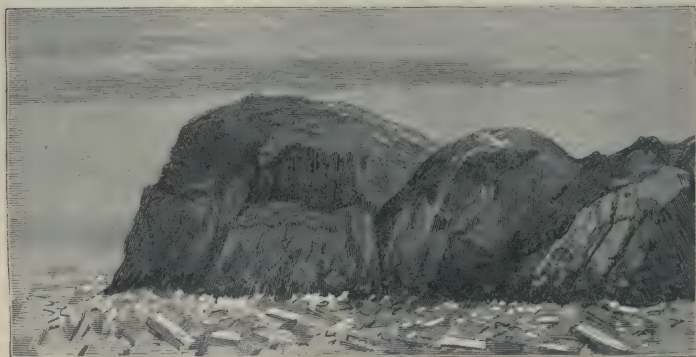
[From a Photograph.]

Brainard also discovered traces of Eskimo encampments, to all appearance of the same age as those near Fort Conger. They were probably made by summer visitors from the permanent habitations discovered by Feilden, at Radmore Harbor, a few

miles to the westward. The deer, musk-oxen, and seal (the latter, owing to the strong tides keeping Kennedy Channel open) for a few years, doubtless, afforded ample food for the ancient Eskimo, who, even children of the ice as they are, could not long abide in this region of almost eternal ice and darkness.

We lost five hours through the launch grounding, but two hours' steaming through clear water took us to Cape Joseph Good, though we were obliged to make a detour inward nearly to Radmore Harbor. Solliffe glacier was veiled in mist. I doubt not it is an offshoot of Mer de Glace Agassiz, as the two small glaciers discovered by Brainard north of Cape Lawrence must also be.

While crossing Rawlings Bay Sergeant Gardiner made a sketch of the bold, rugged headland, Cape Joseph Good, which exactly resembled Cape Lieber as sketched by Hayes, except the high pointed peak in the background, which is like no mountain-top ever seen by me.



Cape Joseph Good.

[From sketch by Sergeant Gardiner.]

CHAPTER XXXI.

RAWLINGS BAY TO CAPE HAWKS.

AUGUST 21st an adverse tide drove us, just south of Cape Joseph Good, to an insecure harbor. Sometime later we moved a short distance south, and improved our anchorage. Here we broke up the Whitehall boat, which leaked badly, had been a heavy drag, and only of occasional use. I held on to her, contrary to advice, until we crossed Rawlings Bay; she was so easily handled by two men that I thought it important to keep her as long as we could. At our first harbor here we came near having a bad nip from an immense palæocrystic floe which set well in to the shore. The launch was grounded a short time at extreme low tide. Bear-tracks were here seen in new snow, and on the 20th some birds, probably falcons, were heard.

Sergeant Jewell was sent to Cape Wilkes, from which he observed much open water on the south side of Richardson Bay. Shortly after an opportunity of reaching Cape Wilkes presented itself. Water opened up to the next point south of us, and the entire pack, under the influence of the southwest wind, moved off shore.

We had, however, gone scarcely a half mile when the ice set violently in toward shore, nearly destroying the launch and boats. The tide being low, the boats were caught between the moving pack and an ice-foot ten feet high; as there were no breaks in the ice-foot, the launch was badly jammed, and for



A SERIOUS NIP.

a few minutes I feared that we would lose her, but the coolness, energy, and desperate exertions of all prevented such a serious disaster. The other boats were slightly injured, but not to such an extent as was naturally feared. One of them was pulled out on the moving pack, but the other two were secured along the ice-foot.

The ice in general consisted of last year's floes, interspersed with small rubble, such as would not have been dangerous for a ship, but was exceedingly so for small boats. The launch was well able to endure the direct pressure against the ice-foot; but the moving pack tended to drag her along the ice-foot, threatening to strip her side and destroy her smoke-stack against overhanging and projecting floes. Fortunately, by prompt action and extraordinary exertions, we succeeded in holding her in a slight break of the ice-foot, where she received no serious damage.

During this nip I was obliged to devote my entire attention to the launch, leaving each boat to care for itself. Brainard, Rice, and Connell, who were in charge of the respective boats, justified the confidence I placed in them by their excellent conduct. Lieutenants Lockwood and Kislingbury materially assisted me with the launch, which was of course the most important of our boats. The movement of the pack inward was caused by the sudden shifting of the wind from the southwest to an easterly quarter, and, as the tide was ebbing rapidly, the direction of the pack was immediately changed. On examination it was found that the boats, although more or less strained, leaked very little.

We were delayed here for several hours, but, by watching closely and taking chances, managed to get into the northeast point of Richardson Bay just after noon. Two hours later we succeeded in crossing, with much difficulty, by making a long detour westward into the bay. Young ice had formed of such

thickness as to cement together the small floes, and was itself sufficiently strong in places to prevent all progress.

It took an hour to get the launch through some three hundred yards of new ice, and at times it became necessary to drop all the boats. Near the middle of the bay we found two large floes, separated by a narrow channel about one hundred yards long, covered with new ice. By dint of great exertions we succeeded in breaking our way through it, and as we passed the two floes pressed together. On reaching the south side of this bay it was difficult to determine which point was Cape Collinson, and, in order to make certain of finding the English cache, I made the nearest land and sent Lieutenant Kislingbury and Private Henry to the first point west, while others examined the cape to the east. Nothing was found of the cache, but Henry picked up a small piece of pine wood and saw traces of ancient Eskimo encampments. Shortly after the flowing tide brought down on us such a quantity of heavy ice that we were driven to harbor near Cape Collinson, in a small bay where there were many grounded bergs, near an ice-foot which was twelve feet above low water.

Sergeants Brainard and Jewell, who made one of the parties sent in different directions, found the cache made by Nares in 1875 near Cape Collinson. A small cairn, without a record, was found near the stores. Brainard reported that the cache had been disturbed. The disappearance of a barrel of bread puzzled me, as the barrel had fallen apart, while the staves and head were intact, except a single stave broken crosswise. There were no marks of violence on any of the staves, nor claw-marks such as might have been expected if it had been broken up by a bear. The tobacco, sugar, and tea were all missing. The rum-cask was found bung downward, with a flaw in it which explains the absence of the rum.

August 22d.—About 1 A.M., at the turn of the tide, the heavy drifting ice threatened serious harm to the launch. The water flowing over the ice-foot enabled us to get the small boats inside it, but the launch of necessity remained outside. The three grounded bergs which had been relied on to protect her floated at high tide, and came near proving her destruction. I remained on watch giving directions until the falling tide, at 2 A.M., grounded the bergs and left the launch safe, when I got into my sleeping-bag quite worn out, leaving orders for Lieutenant Lockwood to run over to Collinson at 4 A.M. if possible. About 5 A.M. the cache was reached and taken up. It consisted of two hundred and forty rations of meat, salt, pepper, onion-powder, and fuel, and one hundred and twenty rations of bread. The rapidly falling tide came near grounding the launch twice while taking up the cache. On rounding Collinson a strong southwest wind was met, with much ice running north, obliging me to make harbor. In running in we struck a piece of old ice, and the shock disconnecting an injured collar of the feed-pipe, we delayed two hours to repair this and cook a warm breakfast.

During this delay Lieutenant Kislingbury went ahead and looked into Joiner Bay, the chances of crossing which he reported to be unfavorable, owing to the great amount of packed ice. High wind, fog, and snow prevailed for several hours. As soon as slack water came we started, taking the outside passage, which proved successful. This course was a hazardous one, but I felt obliged to follow it notwithstanding the advice of my officers, as we could not delay two or three tides for the bay to clear of ice. We had now reached such a point, the 80th parallel, that we were considerably nearer to Littleton Island than to Conger, and it was essential to push on with the greatest possible rapidity, taking dangerous risks rather than

venturing the chances of being frozen in by the new ice which now formed nightly.

We were stopped again, about noon of August 22d, by a dense pack a mile north of Cape McClintock, being, as my journal says, "in latitude 79° , a fact which is very encouraging." The pack moving slightly I shifted our anchorage to a point where we were protected by three large grounded floebergs, which afforded a natural harbor just large enough for the launch and boats.

The rising tide caused the ice-anchor of the Beaumont to slip, and she drifted out on the ebbing tide to the northward just as I chanced to espy her, the watch-sergeant at that time having his back turned. I immediately started the steam-whistle and sent the whaleboat after the Beaumont, which was brought back in a few minutes, all her crew being asleep when she was boarded.

From the lookout on the bergs, it could be seen that even against the flowing tide the southwest wind was driving large quantities of ice out of Scoresby Bay.

The wind lulled, and at slack water, about 4 P.M., we ran south into Scoresby Bay and stopped to reconnoitre.

From the high shore I observed several immense floes, which obliged us to make a long detour inward to cross Scoresby Bay, but we found clear water all the way. In two hours we reached a point just south of Cape Norton Shaw, where a large amount of packed slush-ice stopped us. After a short delay I tried a small lead, but a large floe moving in ahead of us jammed between some grounded bergs and the shore and cut us off. A second lead resulted in a run of a mile, though poor shelter for our boats and a threatening pack necessitated our giving way a quarter of a mile to a point which was in $79^{\circ} 49' N$. The pack moved slowly about noon of the 23d, obliging me to

scatter the boats for shelter to slight breaks of the ice-foot behind grounded floebergs. My journal says: "We are now pressed against the ice-foot by the pack, which will doubtless move when the tide turns. To the southward present prospects are very unfavorable, there being much rubble and small ice packed closely, with no motion even during mid-tide. This jam may possibly be caused by our proximity to Cape Frazer, where the northern and southern tides meet. I cannot understand why no ship has been sighted. We shall be in an unenviable position if we reach Cape Hawks and find none. The season is late, our coal nearly gone, and food entirely uncertain."

High water occurred at 2.15 P.M., shortly after which the pack moved off shore leaving a fine lead, which resulted in an hour's good run, though over a tortuous course. We were finally beset, while trying to make a harbor, in a pack of pancake and sludge-ice, a half mile off shore. During the ebbing tide the pack at first drifted northeastward a little, but shortly afterward the drift changed to the south, owing to an immense floeberg, which was carried steadily in that direction by an undercurrent.

August 24th.—We drifted slowly southward until slack water, when we succeeded in reaching the ice-foot, finding, however, a very poor shelter for the boats. At 9 A.M. a strong northeasterly wind set in, and with great difficulty we moved the launch and one boat five hundred yards to the south to an excellent shelter, which was inaccessible when we first reached the ice-foot. Two boats, unable to move, were obliged to remain behind. High water occurred at 8.30 A.M. It was noticeable that the morning tide both flowed and ebbed from the southeast. I expected the tide would flow from the south, but coming as it did from the north, with the northeast wind, the entire pack set in upon us and came near destroying two boats,

the Narwhal and the Valorous. They were hauled up a small break of the ice-foot, by which a small hole (easily repaired) was made in the whaleboat just above the water-line. Snow and fog here set in, wetting everything and making every one very uncomfortable, as the temperature was at the freezing-point (0° C.). Jewell was sent to the next cape, to the southward of which the ice was heavily packed as far as he could see.

"August 25th.—Just after the turn of the tide, at 4.30 this morning, the ice loosened somewhat, and we succeeded in making a good run of two hours, though obliged to follow closely the ice-foot. When stopped by the dense pack we found shelter for our boats behind stranded bergs. About nine o'clock we ran a mile into the channel, and moored to a flat-topped floeberg with a gently sloping surface on the north side. I was much surprised to see this berg grounded such a distance—a mile—from shore. We obtained from this floeberg plenty of good water to replace the brackish water taken this morning from a berg near the shore."

In mooring the launch struck "head-on," not heavily, but enough to start a collar which was in bad order. The heavy boiler is unfortunately loose and unbraced, and acts like a ram when any direct shock comes. The collar-pipe was repaired by Fredericks after much labor, being in such a condition as taxed sadly his ingenuity. Sergeant Israel's noon observations placed us in latitude $79^{\circ} 45'$, just north of Cape Frazer. Christiansen shot a seal in the morning. Several of us drank of the blood, which to me had a taste very much like the whites of eggs. The tide ebbed to the north, but the flow came from the south, and, with a southwest wind, set a field of large floes against our grounded berg, which floated off to the northeast. We were consequently driven to shore, and anchored behind some enormous

floebergs, where we very patiently watched a large lane of open water, which slowly made from the south after the flowing tide set in.

Dobbin Bay, inside of Joy Point: 11.30 P.M., August 25th.—About 6 P.M. fog commenced forming, and, as the shore-ice was crowding in and might eventually cut us off from a run, I determined to force the boats into open water, although sensible of the danger. With great difficulty we bored our way through the moving pack and reached Hayes Point, where a dense fog and heavy ice drove us to shore. While supper was being prepared I ascertained, from personal observation, that there was open water a half mile south. The moment the fog lifted, about 7.30 P.M., I ran around a number of immense grounded floebergs and reached good water. The fog remained thick, but occasionally the top of Cape Louis Napoleon was visible, so that we continued on our course. About 10 o'clock we ran up to a grounded floeberg, from the summit of which, through the breaking fog, I had a good view southward. The pack consisted of very large but quite open ice, which would have been safe for any steam vessel. With our small launch, considering the prevailing fog and our proximity to Cape Hawks, I did not think it advisable to take the chances, and so I ran to the shore inside Joy Point, where we were cut off from clear water, near Cape Napoleon, by the miserable little corner of a grounded floe only three feet thick and twelve feet across. I set a party at work cutting off as much of the floe as was possible, hoping that the rising tide would enable us to pass inside of it, and sent Sergeant Jewell, with two men, to Cape Napoleon, with orders to look into Dobbin Bay, where every one counted on the presence of a relieving vessel.

I went to bed at midnight, ordering the watch to call me the moment the ice moved or fog lifted.

About 2.30 A.M., August 26th, the sergeant of the watch awakened me, and reported that the ice had opened so that an outside route was practicable to Cape Louis Napoleon. As soon as steam could be raised we started and reached Cape Louis Napoleon, having picked up the reconnoitring party en route. Sergeant Jewell reported that, owing to the heavy fog, they had been unable to see Cape Hawks. Many large floes, with occa-



Cape C. A. Schott, and North Side of Dobbin Bay.

[From a photograph taken at Cape Hawks in 1881.]

sional water-lanes, were visible through rifts of the fog in Dobbin Bay, and bear-tracks had been seen in the snow. The fog being dense, we remained at Cape Napoleon until about 10 A.M., when the large amount of open water, to be seen occasionally when the fog lifted, induced me to attempt an outside passage to Cape Hawks by running across the entrance of Dobbin Bay. The fog was exceedingly thick, but we finally

reached a point in the bay near Cape C. A. Schott, and about four miles directly north of Cape Hawks.

Several extensive palæocrystic floes crowded together cut us off from the south, so we were obliged to make a long detour for Cape Hawks, which we reached at 2.15 P.M., having run in from the straits to the northward of Washington Irving Island. I dropped Sergeant Rice's boat at Washington Irving Island, with orders to examine the cairn and bring in such records as he might find therein. I also directed Rice to observe carefully the condition of the ice to the southward. He reported that the cairn, in which he left a brief record setting forth our movements past and contemplated, had been untouched since our visit in 1881. "The ice to the southward," says my journal, "as far as the eye could reach from the summit of Washington Irving Island, is now in such a state that any well-provided vessel could easily run through it. I cannot but feel that we are in a critical position, not knowing what to depend upon. Since no vessel has reached this point in 1882, or 1883 to this time, we must all feel an uncertainty as to the hope for our relief being at Life-Boat Cove. If there is no party there, our situation is extremely dangerous.

"We have perhaps sixty days' provisions, except sugar; and beyond that time must depend on the resources of the country, which are of the most uncertain character. However, we shall do as we have done—our best and utmost—and by some possible chance we may succeed in reaching Cary Islands."

The condition of affairs was indeed critical, as the temperature had permanently fallen below the freezing-point (0° C.), and young ice was continually forming. Our chances of successful boating thenceforth depended on two improbable contingencies—first, that the temperature should permanently rise

so as to prevent new ice forming ; and, second, that strong gales should keep the floes moving and changing.

With our boats we had worked and struggled over three hundred miles, through constant ice of such size and danger as must be seen to be appreciated ; escaped safely from the hundred perilous nips, we had reached a secure harbor, from which we looked southward a scant fifty miles to the bluffs of Cape Sabine. We knew not that five weeks before the *Proteus* had sunk in the sea within our vision ; but it needed no record to tell that dangers and hardships were before us, and privations, if not disaster, in store.



Icebergs, from a Photograph.

CHAPTER XXXII.

OUR BESETMENT.

IN the meantime we had not been idle. A foot of newly-fallen snow obliterated all familiar landmarks at Cape Hawks, but I soon found the ledge where the English depot was situated. It consisted only of stearine, three hundred and forty-two pounds; rum, about six gallons; preserved potatoes, one hundred and sixty-eight pounds; bread, about two hundred and fifty pounds; pickled onions, ten gallons.

The bread was in casks, which, broken open, contained masses of green, slimy mould, from which we selected all that was eatable. In less desperate circumstances the whole would have been rejected. The barrels and casks were broken up and taken for steaming purposes, as we had only a fifth of a ton of coal left. With this fuel Frederick thought he could steam to Littleton Island, where coal was cached.

We left Cape Hawks at 4.25 P.M., August 26th, and ran southwest parallel with the coast an hour or so, when the old ice increased in amount and much young ice was visible. This young ice much alarmed me, especially as the night bid fair to be clear and cold, which would greatly facilitate the formation of more. I concluded, after careful deliberation, to try a direct course for Bache Island, and gave orders accordingly, on consultation with Lieutenant Lockwood, who agreed with me that it was the best, indeed the only, course to follow. Sergeant Rice, who was in charge of the whaleboat, was called



ENGLISH DEPOT AT CAPE HAWKS.

forward to steer and assist in running the launch, as, in addition to being a man of excellent judgment, he was the best navigator of the party. After leaving the coast the outside ice opened somewhat, and we made considerable progress to the south and eastward, where we met such ice as beset us. If we could have gone a mile farther to a large floeberg, I believe we would have reached water navigable to Cape Sabine—an opinion shared by Sergeant Rice and the acute Eskimo Jens. We tied up to a small floe, with the small boats entered for hauling up, about seventeen miles from Victoria Head.

“August 27th.—Longitude, 75° W. ; latitude $79^{\circ} 22'$, from bearings. Still beset, with no change ; possibly we have drifted a little to the northeastward. Temperature last night went down to 18° (-7.8° C.), justifying to an alarming extent my fears about young ice, which to-day will bear a man in some places. Our condition now is a trying one, but had we run along shore to Allmann Bay, where Nares had such an experience with young ice, I feel certain we would have been in a worse condition. We saw several narwhals this evening. I had a tripod twelve feet high rigged up for a lookout. About 8 P.M. called the men together and explained our condition to them. Told them there was a fair chance of getting through, as there was a day's coal for steaming ; and that, at the worst, we could reasonably expect within the next thirty days to drift into Smith Sound, where we must pass within eight or ten miles of the coast. Everybody appears to be in good spirits, and no one, I think, is disheartened.”

Lieutenant Lockwood writes : “There are a great many dangers in being out in the straits this way, but probably it is better than the other alternative. The English had great difficulty in crossing Allmann Bay, having to break through young ice four inches thick. This they managed to accomplish (with their

large vessels), but of course the little launch could never get through any such ice."

The temperature the following night sank to 12.5° (-10.8° C.), but rose in the day, under the influence of the sun, to 30° (-1.1° C.). The sky was unfortunately clear, the weather distressingly calm, and the latitude at noon $79^{\circ} 23' N.$, showed two miles' drift to the north. We found on an adjacent floe a fine pool of fresh water, which obviated the necessity of melting ice.

A proposition was made to reduce the rations, which I considered inadvisable, fearing the effect on the spirits at the time, and on the strength later when extraordinary exertions would be necessary. Brainard's field journal says: "Connell walked on the new ice; it is now three inches thick. Adversity in any form would fail, I think, to dampen the spirits of the men. Our situation is desperate. Any moment the ice may crumble beneath our feet, and the sea swallow up the entire party, still, while exercising on the ice this evening, the men danced and sang as merrily as they would have done in their own homes. They are irrepressible in the face of all this uncertainty and perhaps starvation."

"August 29th.—Situation substantially unchanged. A minimum of 22° (-5.6° C.) was registered last night. Calm weather all day, which, continuing, will soon prove fatal to our efforts to reach Victoria Head, and must inevitably lead to the abandonment of the launch and at least one boat. Our only chance of escaping the pack seems to rest upon a storm, as the young ice grows steadily thicker. Some of the men washed in the pool of water found on the adjoining floe, but most did not. I decided to-day to allow the fire under the boiler to go out, so as to save our small stock of coal for further emergencies."

"August 30th.—Israel got a meridian altitude to-day, which

puts us in $79^{\circ} 22' N.$, and shows a drift south of 1.4 miles in two days, a distressingly slow rate. Day very fine and bright, but too cold for a weather-breeder. The minimum last night was 11.8° ($-11.2^{\circ}C.$), the lowest August temperature within my memory. An inventory to-day shows that we have left: Bread, 1,100 lbs.; corned beef, 187 lbs.; roast beef, 26 lbs.; English beef, 16 lbs.; English bacon, 100 lbs.; boiled bacon, 38 lbs.; American bacon, 112 lbs.; pemmican, 150 lbs.; pemmican (Polaris), 135 lbs.; pemmican, plain, 168 lbs.; pemmican, Hudson Bay, 100 lbs.—making 1,244 lbs. of meat; extract of beef, 5 cans; extract of mutton, 29 cans (each can of extract holding about $1\frac{1}{2}$ lbs. net); soup, 17 cans; butter, 33 lbs.; beans, 58 cans; cranberry sauce, 6 cans; apples, 6 cans; tea, 20 lbs.; salt, 4 lbs.; pepper, $\frac{3}{4}$ lb.; candles, 4 lbs.; preserved potatoes, 168 lbs.; coffee, 12 lbs.; tobacco, 40 lbs.; stearine, 519 lbs.; wicking, 3 lbs.; lime-juice, 10 gals.; alcohol, 40 gals.

“We have tea and coffee enough for forty days, all other provisions sufficient for fifty days, but they can be easily made to last sixty days. In the meantime there is no telling what may befall us. Connell thought he saw smoke in the direction of Cape Sabine. It is so cold at present that one can keep warm only by exercising. A fox and three gulls (burgomasters?) were seen to-day.”

“August 31st.—Falling weather this morning added to the foot of snow which now covers loosely the floe; from our cross bearings it is possible we may have drifted two or three miles to the south-southeast; no observations to-day. The men are generally well, although suffering considerable discomfort from the cold. Ralston's mouth is sore, and the doctor ordered lime-juice for him. Lieutenant Kislingbury has a slight cold. Served out three-eighths of a gill of rum to each man to-night, taking none myself. It appears evident that we shall be con-

fined here some time. I can not think that we shall have open water again this year, but refrain from saying so to the men. Consulted with Lieutenant Lockwood regarding our future movements. I told him that September 10th was the limit which I was willing to await for the spring tides and wind to break up the floes and release us. In case this does not occur, I propose to cache our pendulum and records on Bache Island, abandon all but the ice-boat, and with that reach shore, believing that we can carry but one boat. Lieutenant Lockwood agreed with me as to the unadvisability of waiting beyond the 10th, but thinks at least two boats should be taken."

"September 1st.—Our latitude, $79^{\circ} 19' N.$ by observation, ($73^{\circ} 45' W.$) was somewhat encouraging. At 2 P.M. the young ice cracked considerably, and shortly after the heavy floes from the north set down rapidly toward us. The boats, which had been already entered, were hauled up. The launch, caught by the thick floes, was raised entirely from the water, but stood the shock without injury. The young ice, weakened by the new snow, broke up with the shock and piled huge masses of rubble on the edges of all palæocrystic floes. The action appeared to be due to the strong tide, which was about half ebbcd. The launch remained entirely out of water until 6 P.M., when the flowing tide loosened the heavy broken ice and allowed her to settle to the water-line. At the first signs of danger everything was removed from the launch, so as to avoid any possible loss of provisions or other supplies. Christiansen and Jens went north on the ice this morning and killed a small harbor-seal, which, by adding a half ration of bacon, will make two good meals. Two walruses were heard last night by the Eskimos."

"September 2d.—Later Jens killed another small harbor-seal. I gave him a half gill of rum as a reward, and have promised the same allowance in case of any game being killed by him or Chris-

tiansen. The weather is calm and foggy, with a great deal of water around between the floes east and west as far as can be seen, that is, from two hundred and fifty to three hundred yards. Of course it would be insanity to attempt to move in such a dense fog, and with the heaviest tide of the month only an hour off. It is tempting, but too dangerous. In order to avail myself of any opportunity, I had the boiler refilled with water this evening.

“As soon as the tide changed, just after midnight, the pack closed suddenly and violently, and within two hours the launch was lifted bodily from the water and settled down again three or four different times. This speedy change in the condition of the ice shows how dangerous the attempt to move would have been. It would have taken an hour to get up steam, and if we had started we would probably have been crushed by the ice, but in any event would have wasted our fuel. Those who last night were clamorous to go on had nothing to say this morning, when not a pool of water could be seen. When the nip occurred Lieutenant Lockwood, who is the only one at present sleeping in the launch, got up once, but turned in again, preferring the comfort of the boat, with the accompanying danger, to sleeping on the floe. During the commotion our heavy floe, jammed between immense palæocrystic floes, was so badly cracked as to render it necessary to move. At 6 P.M., at the turn of the tide, I gave orders to keep a sharp lookout, in order that we might change our quarters if the ice should loosen to such an extent that we could move the launch, which was sharply nipped. The ice remained closed around the launch during this tide, although it opened in three places. Lieutenant Kislingbury has been discussing our position freely with some of the men, particularly with reference to moving. As the launch cannot be started, such a change would mean its temporary abandonment

and possible loss with all it contains, a course not to be thought of as yet. Our floe is not a palæocrystic one, and there is none such near by. During the changes to-day the palæocrystic floe from which we have obtained water moved away."

"September 3d.—Israel got an excellent meridian observation to-day: our position is $79^{\circ}15.6'$ N., 74° W. Private Whisler's term of service ending to-day, he was given his formal discharge and final statements. None of the men have been very despondent during our besetment, yet it is noticeable now that they are very much encouraged by our latitude. Just after eleven o'clock last night the ice loosened sufficiently to allow the launch to sink to her water-line. I at once put the boats into water and moved the party to a larger and stronger floe, on which we are now encamped. Our new floe is a mile long by a mile and a quarter in width, but has no water. Our boats are well hauled up, and the launch secured as safely as possible. Most of the crew belonging to the launch have returned to her, and are now sleeping in her. There has been no pressure from the ice during the last two tides, which I consider an encouraging sign, as it seems to indicate an open space of possible navigable water a little to the south of us. We have a tripod up, but can scarcely see more than five miles in the most favorable direction, and perhaps two or three in other quarters. The only water in sight from the tripod consists in a few small passages near us. The weather remains dull and distressingly calm. My ink froze solid last night. At 8.30 this morning Victoria Head bore 4° S. of West; now, 1 P.M., it is nearly 16° , indicating a northerly drift during the flowing tide. Gardiner has made an excellent sketch of Bache Island, showing Victoria Head, with Cape Albert in the distance.

"This afternoon, I overheard Lieutenant Kislingbury dis-

cussing our situation again with some of the enlisted men, commenting strongly on our remaining quiet, and also because I did not move in the fog of Saturday night. I at once interfered, fearing the influence of such criticism upon the discipline of the enlisted men, whose soldierly conduct has been so far admirable. I called his attention to the fact that such criticism was unofficer-like, and could not but cause discontent, if nothing more. He disclaimed any intention of reflecting upon me.



Victoria Head, bearing Southwest, six miles distant.

[From a sketch by Sergeant Gardiner.]

“Later I thought best to call together the officers and two of the sergeants. In dwelling on our situation I pointed out to them the indispensable necessity of hearty and united action, and of supporting to their utmost any plan which I should adopt. I expressed a desire for the frankest possible opinion of each one as to what would be the wisest measures to pursue. I said that every one was aware that we were drifting slowly southward, and that every opportunity of moving south or southwest was improved. I expressed my opinion that a party with provisions, and probably a ship, were at Life-Boat Cove; but,

as regarding plans for the future, I did not feel that we should calculate on any provisions beyond the two hundred and forty rations known to be in Payer Harbor. Lieutenant Kislingbury, whose opinion I asked first, advised the immediate abandonment of the launch and one boat ; and that, with our sledge, we attempt to move two boats and five thousand pounds of selected baggage to Victoria Head. He thought we could move everything, without difficulty, from floe to floe. He would follow Bache Island to Cape Albert, and, instead of attempting to cross Buchanan Strait, would pass around it, by which route he thought we could reach Cape Sabine in the time during which our rations would last—fifty to sixty days. Dr. Pavy's opinion was the same as Lieutenant Kislingbury's, except he would delay a day. He thought we could make four miles a day, and that Cape Sabine could be reached within a month. Lieutenant Lockwood was unwilling to recommend any change in our plans for the present, as waiting on the drift could do no harm, and he believed there was no chance of crossing the pack at present. Sergeant Brainard said that, from past experiences, he believed it impossible to reach shore with our heavy load in the present loose state of the ice ; and that he thought it best to await the action of the drift until open water appeared or the young ice was strong enough to travel over. Present exertions would only exhaust us. Sergeant Rice's views were the same as Brainard's. He said that, if Lieutenant Kislingbury's plans were followed, he felt positive only one boat could be got to Cape Sabine, and that, in case of crossing Smith Sound, but half the party could go, and the future of the remainder would be uncertain. He preferred waiting the chances of the pack opening, or, later, the formation of young ice. I then said that my plans would be to uniformly and persistently follow any opening which could carry us either south or toward land, but

that I thought any immediate movement, unless lanes of water should appear, would exhaust the strength and spirits of the party in fruitless efforts. They knew, from hourly experiences, that the floes were not united, and that constant changes were occurring in the pack; and I thought it best to await the action of the current. If, by extraordinary exertions, Bache Island could be reached, our foot-gear would about be worn out, and we would still have Buchanan Strait, nearly twenty miles wide, to cross by boat.

“If our drift carried us to the southwest, we could make the nearest land (Cocked Hat Island) as soon as young ice would permit travelling; and, if carried greatly to the southeast, I would try to reach the nearest point on the Greenland coast (Cairn Point or Littleton Island), relying on the dense and cemented ice in that direction to enable us to reach land. Sergeant Brainard said the men would cheerfully agree to any reduction of rations, in which Sergeant Rice agreed, but thought the doctor’s opinion would be valuable on that point. The doctor thought a reduction would not be *positively* injurious. I said I thought it best to continue full rations for the present, as we had bread, meat, potatoes, and fuel to last until November 1st, and needed strength for emergencies.”

“Off Victoria Head, September 4th.—William Whisler enlisted as a private to-day. Commenced preparations for future travel. Cross and Elison made a sledge from the launch-seats, which is to be shod with iron bands from the boiler. Jens shot a small harbor-seal to-day. Fredericks reports that our canvas cannot be well utilized in making tents, and recommends a tepee on the Indian style, so an experimental one of fifty-four feet circumference, which could accommodate eighteen men, was put up on the ice. The ice-boat Beaumont, with canvas shelter, will hold nine, so that the sick (if any)

and most weakly can easily be sheltered in her when we travel.

"The tepee is made of the sails (uncut and available as such) of the launch, whaleboat, and dingy. A very large palæocrystic berg which has kept us company seemed nearer this morning; sent Lieutenant Lockwood, Connell, and Christiansen to it. From the summit of the berg, probably a hundred feet above the water-line, several leads were seen in the northerly quadrants, and also toward Bache Island, which could not be reached.

"At 9 P.M. the ice loosened up, and it appeared possible that Cape Albert might be reached. The boats were immediately put into the water, and took the launch in tow while she was getting under steam. We were able to proceed only about a mile toward the southwest, and were then obliged, by the closing of the pack, to take refuge on a small palæocrystic floe about two hundred yards square, on which the boats were hauled up and the launch secured as safely as possible. She was raised during the night by the moving pack some distance above her water-line, but very gently and without receiving damage."

"September 5th.—Meridian observation to-day in $79^{\circ} 09' N$. We have made seven miles southing in two days, a fact which gratifies everybody, and shows that the pack is in such a condition that a movement by sledge would be not only dangerous but impracticable. The day is bright, fine, and clear, with a low, threatening barometer, which continues falling. May the gale come from the north! We commenced melting ice for cooking to-day, there being no floe with a lake accessible.

"Long shot a small harbor-seal, which will serve for two meals when cooked with a half ration of bacon. Everybody eats seal now, although only a week ago there were at least three who could not abide it. A number of the men drink the blood of the seal whenever they can obtain it. The launch party, of

which I am one, has concluded to sleep in her, taking the chances of a precipitate retreat in the height of a gale to sleeping on the naked floe. It is strange how indifferent we become to dangers and perils that daily, rather hourly, beset us, and which, stirring and exciting to us at first, now seem ordinary and a matter of course. The Eskimo and Long are hunting, as usual; Jens saw a small seal and went out in his kayak, but did not get him. The temperature is down to 13.9° (-10.6° C.), and we suffer much in our inactive condition from the cold."

"September 6th.— $79^{\circ} 0.6'$ N.; about $74^{\circ} 45'$ W. A heavy gale from the northeast set in last evening. At first we drifted rapidly to the south, but later moved very slowly, although wind and tide were both in our favor. From this it would appear that there is no water of extent between us and the south side of Buchanan Strait. The launch has escaped unharmed from the pressure of the pack to-day, receiving only two nips which raised her gently and slowly a foot or two above the water-line. The watch awakened us when the nips occurred, but, the ice not being of a very dangerous character, nobody troubled himself more than to glance at it and go to sleep again. This morning Cape Camperdown, which has for several days been observed by compass for Cape Albert, was 4° south of west. From this it seems we have made only two or three miles southing, although we have moved considerably to the west and are now only three miles from the land, Capes Camperdown and Albert being equidistant from us. It was an agreeable surprise to us when our noon observations gave $79^{\circ} 0.6'$. It is evident that the south coast of Bache Island is laid down wrong, or else the declination has changed very materially since 1875-76. I presume that the position of these capes must have been laid down from bearings or from dead reckoning. Cape Sabine and Victoria Head, I suppose,

must be accurately located. Victoria Head has agreed with our previous observations, but Cape Albert has been out all the time. It is very encouraging to know that we are only seventeen or eighteen miles from Cape Sabine, and twelve or thirteen from Cocked Hat Island. I doubt not we can reach Cape Sabine without any extraordinary efforts; one opening by boats, and then the sledge must do what is lacking. It is bright, sunshiny, and pleasant; minimum temperature, 19.5° (-6.9° C.); and the men are improving it by drying everything, and by putting our foot and other gear into the best possible condition. I pray for a gale, as a clear, calm night with the sun now below the horizon, would be fatal to any farther advance by boats, as the tides are unfortunately neap the next two days."

"September 7th.—In reducing our magnetic bearings, it has previously been assumed that the variation of 110° given on the English map was correct, but, as the reductions of our observations do not agree with the map, I directed Sergeant Israel to make special observations for declination. From such observations, at 5 P.M. to-day, the variation was determined to be $105^{\circ} 9'$ W., which makes our bearings more, although not entirely, in accord with the chart. Cape Camperdown is now due west, and hence must be in this latitude, $79^{\circ} 0.6'$, which is some two miles farther south than is shown by the map. The trend of the south coast of Bache Island is apparently correct, as we cannot see the Weyprecht Islands."

"September 8th.— $79^{\circ} 0.6'$ N.; about $74^{\circ} 45'$ W. The temperature last night was fatal, I fear, to farther advance by boat, as it sank to -0.8° (-18.2° C.), the lowest I have known this early in the season. The young ice over large pools will not yet bear a man, but will do so wherever there is the slightest mush or rubble ice. The barometer is yet rising, but the little

wind we have hangs in the north. In consequence I have decided to sledge, and have accordingly given orders to hurry up the sledge repairs and building. Last night a walrus showed itself in the open pool near the floe. Connell first saw him and gave him five shots, Lieutenant Kislingbury two, and Christiansen two, but apparently it had no effect upon him. Several others were heard during the night. An excellent observation at noon showed that our position was unchanged; and, indeed, it was evident to us all from the lay of the land and the bearings. Lieutenant Lockwood, Sergeant Rice, Christiansen, and I visited a large palæocrystic floeberg some four hundred yards east. The berg was about a half mile long by a quarter of a mile wide, and had an extreme elevation of, say eighty feet, and an average one of sixty. Running entirely across the south end of the floe were two ravines, separated by a hill ranging from twenty-five to fifty feet in height, in which lay rocks of very considerable size, say from one hundred to five hundred pounds, which were scattered from one end of the ravine to the other and generally covered by new snow.

“These rocks are evidently the remains of a medial moraine, and prove conclusively the correctness of my previous observations and deductions—that palæocrystic floebergs are parts of an enormous glacial ice-cap. [Lieutenant Lockwood’s journal shows that he had discovered such rocks on a floeberg September 4th. There is doubt as to its having been in the same berg.] The only open water visible was a lane two to four hundred yards wide, which ran south from Camperdown perhaps a third of a mile; in all other directions nothing was seen besides densely packed ice. The floes visible were large, in general of last year’s ice; occasionally, however, a palæocrystic one was visible. The Eskimos both say that the ice in Buchanan Strait is of last year, and that it has not broken up this summer. The un-

broken ice, as they call it, was four to six miles distant. I looked for the best route, which seems to coincide with the direction of the nearest land, Cocked Hat Island, toward which our efforts will turn Monday, unless important ice changes occur in the meantime. Run issued in the evening.

“September 9th.—Lowest temperature last night, 8.5° (-13.1° C.), with a fresh northerly wind, which had no effect upon us. Our position remains unchanged, and the young ice grows thicker. Steam was got up to blow the boiler out and leave it in such a condition that it can be readily used. The launch was pulled up as far as possible on the floe, and secured by anchor and chains. This morning I called together the officers and Sergeants Rice and Brainard. I notified them that, unless some great change took place, I should start by sledge to-morrow for Cocked Hat Island, and that two boats and all provisions would be taken. The second boat was to be taken in deference to the opinion of the officers, who thought a movement with one boat dangerous, although I felt confident a day's experience would show the impracticability of hauling two. I was doubtful as to the advisability of taking along three hundred pounds of stearine, the shot-guns, and their ammunition, but decided to do so, although the latter could be of no use this autumn.

“I informed them that, excluding sledges, we had sixty-five hundred to seven thousand pounds to haul, so it was evident that we must travel three times over the same ground. As soon as we were at such distance from land as to make separation any way secure, I contemplated sending an officer and two men for such reports and information as might be found at Brevoort Island. If we learned that boats were there, as they should be, we could drop our own and make good time, but at present I hardly looked for more than two miles advance a day. At Cocked Hat Island I intended leaving everything, except

sleeping-bags, cooking-gear, and a few days' rations, and move thence rapidly to Cape Sabine.

"I then asked the opinion of each one as to the advisability of further delay, as to any modifications of my plan, as to what could be abandoned, and for any other practical recommendations. Lieutenant Kislingbury advised no further delay, and had no recommendation, except that boats and everything should be on the same floe at all times; an impracticable plan, owing to the many small floes, where each transfer would entail a loss of hours in changing loads. Lieutenant Lockwood recommended no change, but thought everything should be taken and abandoned later. Dr. Pavy concurred in the views previously expressed, but recommended the abandonment of one keg of lime-juice, which was done. Sergeants Rice and Brainard had a few practical recommendations as to loading, etc. Brainard suggested that a man be detailed to select the route of travel, which I approved. I prepared records, which were left in the launch and Valorous, wherein were set forth our condition and my intention of reaching Littleton Island and possibly Cary Islands.

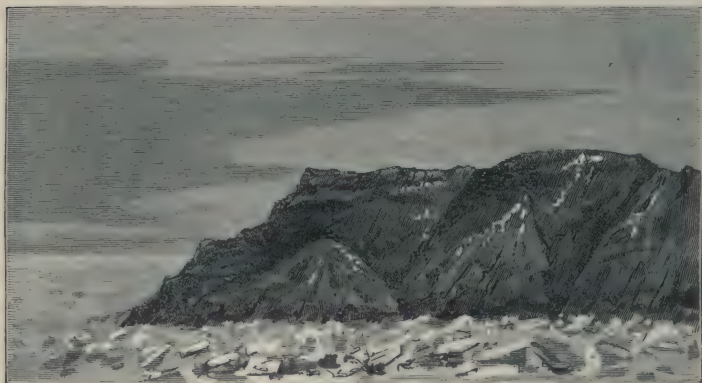
"On this day in 1876 Nares was fortunate enough to escape the pack in a latitude twelve miles north of this point, but it is very certain that he could not have done so this year, even from a few miles south."

At this time occurred to me the idea of attempting to reach Cape Sabine over the moving pack in order to communicate with the relieving steamer, whose presence we expected, which was soon to leave Smith Sound, September 15th being the date mentioned. Such an attempt, while involving possible death for those venturing, might also save the party from great future suffering and perhaps death.

I accordingly broached the subject, mentioning also Sergeant

Brainard, who had volunteered to accompany me. The officers objected to my personally venturing; and, although other volunteers were not wanting, the plan was dropped, as I was unwilling others should incur such obvious and extreme danger. I acknowledged the views of my officers to be wise and right, and afterward I confined myself to the position of being the last man of the party until land was reached.

We had been beset fifteen days, and had drifted twenty-two miles to the southward; but now the winter floes seemed fixed,



Capes Albert and Camperdown of Bache Island, bearing West, four miles distant.

[From a sketch by Sergeant Gardiner.]

and for three days we had not moved, while the young ice, steadily forming, was from four to six inches in thickness.

To the westward, a few miles only, were Capes Albert and Camperdown of Bache Island, while, in the direction of promised and expected help, Cocked Hat Island was only eleven miles distant. Evidently the time for exchanging the boats for the sledge, and for abandoning the policy of patient waiting for that of energetic action, had come.

During our long days of inactive and weary waiting the conduct of the enlisted men had been worthy of the highest

praise. The steadily increasing cold, the monotony and confinement to a narrow compass of ice, the many discomforts of their surroundings, and the grave uncertainty as to their future fate (which evidently must entail even greater hardships), had no power to dishearten or discourage them, and even failed to quench their exuberant spirits.

Sergeant Brainard, in that desperate strait, truly wrote: "The conduct of the men since we have been in this unfortunate situation has been beyond all praise. They are to be highly commended for their unselfishness, and for their happy faculty of making the best of everything, even under the most trying circumstances. When first imprisoned in this uncertain pack, I thought there would be endless repinings and lamentations; but, to my surprise, good-natured chaff, a hearty, ringing laugh, or a snatch of song can be heard from the irrepressible little band almost any time. Most bodies of men placed in these circumstances would have become discouraged, and have lost their spirits, and even all interest in efforts to save their lives."

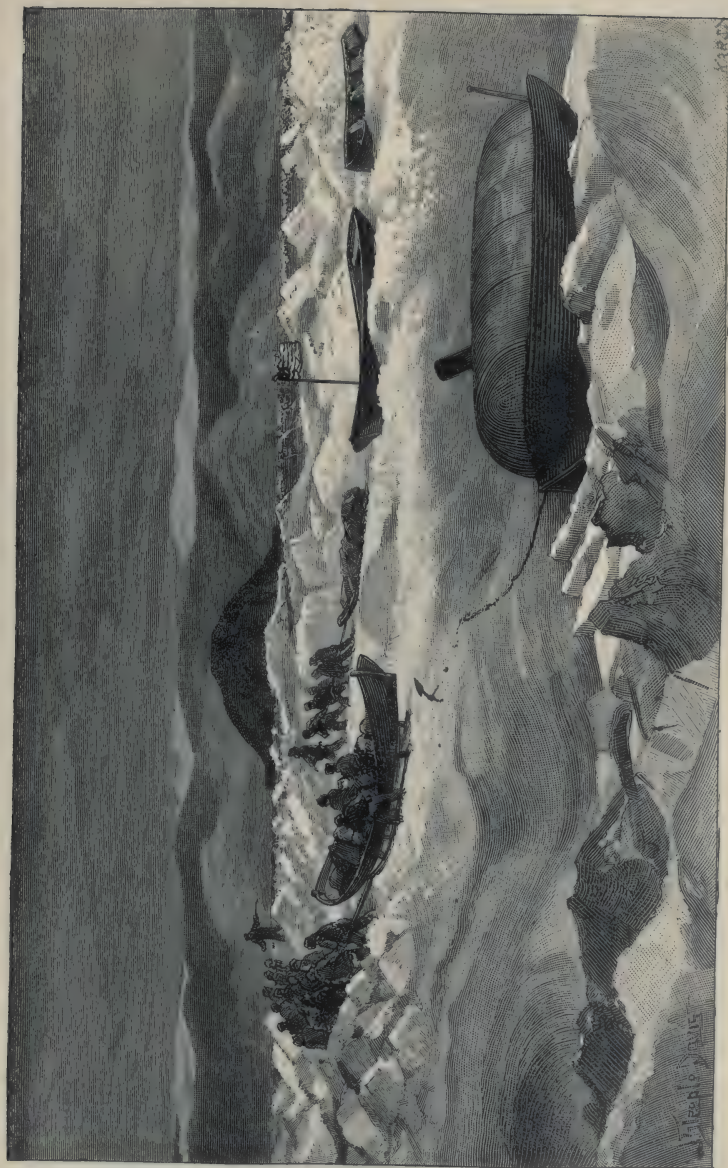
And so, that last Sunday evening on the frozen sea, we offered words of praise to the Almighty, and, with renewed faith in the Divine Providence, with no repinings over past sufferings, but with the determination to do our best and utmost on the morrow, we sought what rest we could in our comfortless bags.

CHAPTER XXXIII.

STRIVING FOR THE SHORE.

“SEPTEMBER 10th.—Fresh northeast wind, with light snow, kept us quiet in the morning, but, the weather clearing somewhat, we started at 1.45 P.M. The twelve-man sledge, with the ice-boat *Valorous* and six hundred pounds other weights, was dragged by myself and thirteen others; Lieutenant *Kislingbury*, with five men, dragged seven hundred pounds on the six-man sledge; and Sergeant *Jewell*, with three men, some four hundred pounds on the four-man sledge. The four-man sledge broke down so completely shortly after starting that it had to be abandoned. The six-man sledge, breaking down near camp, was taken back to the launch for repairs, and later hauled a load. With the twelve-man sledge I then returned for the whaleboat and six hundred pounds. Later the same sledge returned for the loads left by the broken-down sledges, and the last party got into camp at 7.15 P.M.

“To make a mile and a quarter good toward *Cocked Hat Island*, we have travelled nearly twice that distance to-day, thus making at least ten miles' march for all, and fifteen for some. After the first load had been hauled heavy snow set in, which made travelling very uncomfortable. Only nineteen men, including the officers, except myself, returned for the third load. The twelve-man sledge certainly does astonishing work, for now I realize the force of *Nares'* statements that a boat enormously



ABANDONING LAUNCH LADY GREELY—SEPTEMBER 10, 1883.

increases the difficulty of travel.* The weight at the ends, acting as levers with a powerful fulcrum, causes us to work at a great disadvantage on a rough road, which is about half the time. The snow, about a foot deep, also impedes our progress,

and the opinion is general, that it requires about as much expenditure of energy to travel through such snow with a light sledge as with a loaded one.

“The officers have followed my example, and have taken to the drag-ropes without being requested to do so. Every one pulled with great energy, and the heavy work, coming after long inaction, has taxed every one’s strength to the utmost. For myself, I am thoroughly worn out physically, not to mention mental anxiety as to both present and future.”



Jens, our Water-Seeker.

“September 11th.—Camped on a palæocrystic floe last night where there was a water-pool, over which the young ice was

* Nares says: “When a navigable boat is added to a sledge, the difficulty of the journey increases enormously. Dr. Rae, although an experienced Arctic traveller, in 1849, could not move his boat a single day’s journey over the ice until water made.”

about six inches thick, and we are equally fortunate to-night, thus saving time and fuel for cooking. Jens has constituted himself our water-seeker, and as soon as camp is made he sallies forth with his ice-staff in hand; and, tapping around in the deep, soft snow, soon finds a frozen cake on the palæocrystic floe.

“Light snow, with very thick weather, this morning, so I directed the men to remain in their bags until it cleared somewhat. At 8 A.M., Cocked Hat Island being visible, orders were given to start, and at 8.40 the Valorous moved out, followed by the six-man sledge. We are camping as follows: Lieutenant Lockwood, Dr. Pavy, and myself, with nine men, sleeping on the ice, covered by the tepee; Lieutenant Kislingbury and six others in the whaleboat; Sergeant Brainard, with six others, in the Valorous. Amongst those sleeping in the boats are the weakest, who are much more comfortable there than on the floe. Saw a large raven this morning. Sergeant Brainard has been very energetic to-day, as yesterday, in selecting our route. Although heavy snow set in to-day just after starting, we were able to make nearly a mile good. We are now camping on a very large palæocrystic floe, which extends to the southwest some two miles to an immense floeberg. An inch of snow fell in three hours this morning. All made two trips, and then fifteen men, including Lieutenant Lockwood and Dr. Pavy, went back for the last load, which, being heavier than was calculated, took them longer than the other trips. Lieutenant Lockwood insisted on returning in my place, believing that I should show myself some consideration physically on account of mental anxiety and responsibility. On the arrival of the last load supper of hot tea and stew was ready for the crew, and we had also erected the tepee, fixed up the boats, sleeping-bags, etc. Dr. Pavy and Sergeant Brainard went later to a large floeberg some

two miles ahead of us, and brought back very discouraging reports. Toward Cocked Hat Island new ice extends from two to four hundred yards, and then only rubble from young ice as far as they could see, while the only floes seen were to the eastward. To the west the rubble was more dense than to the south, and it was several miles to the heavy fast ice. From Cape Camperdown stretched for a mile south a lane of very young ice. They thought that the floeberg was grounded, and had prevented this pack from moving south. The pressure on the floeberg must have been tremendous during the late storm, as rubble from the palæocrystic floes had been forced up to the height of fifty or sixty feet. I called together the officers and Sergeants Brainard and Rice ; and, after Dr. Pavy and Sergeant Brainard had reported the condition of affairs, informed them that the spring tides would come in about four days, and asked their opinion as to our future movements. Lieutenant Kislingbury, Dr. Pavy, and Sergeant Brainard advised moving up to the berg to await the heavy tides. Lieutenant Lockwood advised going to the east of the floeberg and camping there, sending out men to examine practical routes. Sergeant Rice thought it possible we might in some way reach the ice to the westward. I said that we had only forty days' rations, and that time just now was more important than rations, as darkness was fast approaching. I was unwilling to exhaust the strength of the men by moving our enormous load in any direction, until it was certain we should move in that quarter ; and, as Dr. Pavy and Sergeant Brainard concurred in thinking that the two miles to the floeberg could not be made in less than two days, owing to the heavy snow, I would start in that direction, but at the same time send out parties to examine other routes. Dr. Pavy and Sergeant Brainard saw several walruses in the young ice, and thought that they heard a dog bark. It caused a faint

hope to rise up in our hearts, but after several shots were fired we concluded they must have been mistaken."

"September 12th.—78° 50.9' N. I decided this morning to select the route before starting, and so sent Dr. Pavy to the southeast and Lieutenant Kislingbury to the southwest. The men in the meantime improved the sun by drying sleeping-bags and clothing. Last night the ice melted under us in the tepee, wetting the sleeping-bags through. The men yesterday did not eat their entire ration, and half a ration was issued to-day, the entire party being content. Both scouting parties returned at 1.25 P.M. Lieutenant Kislingbury brought back the most discouraging reports of the ice to the southwest. Dr. Pavy and Sergeant Rice reported a practicable but difficult route to the southeast, and we moved at once. As we were about to start, the three officers and two sergeants came to me and strongly and unanimously recommended the abandonment of the whaleboat, fearing it might break down our sledge and compromise our ultimate safety. I at once concurred, being satisfied of the necessity, as I believed from the first that only one boat could be taken. I have only hauled the second out of deference to the opinion of all of my officers and most of the men, and it took two days instead of one to convert them. We put a flag on the mast in the whaleboat, and left a record. Bear-tracks were seen to-day, and many walrus-holes in the young ice. We got off at 2.10 P.M., and found a chain of small lakes on a large palæocrystic floe, which afforded excellent travelling and enabled us to reach the end of the floe at 3.30 P.M., making a distance the doctor and Sergeant Rice had reported upon their return it would require two days to pass over. Our progress shows the decided advantage of detailing Brainard to select the route. Beyond was a belt of new ice, interspersed with occasional heavy rubble and narrow channels of open water, which de-

cided me to camp. The second load hauled quite heavily, but we made it in an hour and a quarter; everybody in the dragropes, except several whom I detailed to cook, etc. We have made good about two miles in a direction nearly south. Owing to the very bad ice just in front of us, we shall have to make three and possibly four loads to-morrow. We have used our last sugar. Rum is now issued after each day's march."

"September 13th.—Established a guard during the night, as bear-tracks a day old were seen yesterday. The abandonment of the whaleboat has deprived Sergeant Rice and his party of its shelter, and in consequence they have commenced sleeping on our two sledges. The sun was shining this morning, for the first time since leaving the launch; and, indeed, for some time before. The temperature was 6° (-14.4° C.) during the night, and only 10° (-12.2° C.) at 3 A.M. We started at 7.30 A.M. The road over the rubble ice to the next floe had been smoothed down with axes last evening by a party, but was yet exceedingly bad, even dangerous in places, and was only practicable for light loads, of which there were three. In moving forward Private Bender and Dr. Pavy broke through the young ice, but neither were wet much. The large sledge broke through twice, fortunately damaging nothing, owing to Rice's prompt action and the men's responding to his warning. The first trip lasted until 9.30 A.M., the second until 12.30 P.M.; and the last load reached our new camp at 3.15 P.M. With breaking and making camp we are occupied from twelve to thirteen hours, as much of this exhausting labor as the men can stand regularly. Lieutenant Kislingbury, with his party, made two trips with the six-man sledge. Sergeant Israel, left in camp during the second trip, got a meridian observation giving $78^{\circ} 56.9' N.$ Several walruses were seen breaking through the young ice at various times, and Brainard saw fresh

bear-tracks again. There are wide differences as to our distance from Cocked Hat Island, it being variously estimated from four to ten miles. In my own opinion it is eight."

"September 14th.—I called the cooks at 5 A.M. The temperature rose from 13° (-10.6° C.) last evening to 19° (-7.2° C.) at 6 A.M. We moved everything in two trips to-day, but, owing to an accident to Lieutenant Kislingbury's sledge, did not get everything into camp until 5 P.M. The party were exceedingly tired, the work being of the hardest possible kind.

"The absence of sufficient light to cast a shadow has had very unfortunate results, as several of the men in the past few days have been sadly bruised or strained. When no shadows form, and the light is feeble and blended, there is the same uncertainty about one's walk as if the deepest darkness prevailed. The most careful observation fails to advise you as to whether the next step is to be on a level, up an incline, or over a precipice. These conditions are perhaps the most trying to Sergeant Brainard, who, being in advance selecting our road, finds it necessary to travel as rapidly as possible. A few bad falls quite demoralizes a man, and makes him more than ever doubtful of his senses. Travelling slowly, with our heavily laden sledges, we rarely suffer much from this trouble, as our steps are slow and uncertain at the best, but when a jar does come on a man pulling his best, it gives his system a great shock and strain.

"Brainard saw a walrus to-day, and Gardiner a fox last night. Sergeant Israel remained in camp during the second trip, but did not get an observation until about 1 P.M., from which the latitude may be anywhere from $78^{\circ} 54' N.$ to $78^{\circ} 56' N.$ At half past three this afternoon, to our dismay, we found that there was a marked movement of the pack toward the north-east, driven off shore by a high southwest wind, which soon

turned to a violent gale and drove us farther north in three hours than we had travelled southward in as many days.

“Our evening was naturally a most gloomy and despondent one, but its other troubles and anxieties were augmented for me by the behavior of Dr. Pavy, who not only misrepresented my orders to Brainard regarding the day’s route as calculated to destroy the party, but endeavored to stir up feeling by falsely representing that he had advocated my remaining at Fort Conger. Such advice, which would have entailed a direct disobedience of orders, was never tendered, and would never have been considered, except physical conditions had rendered the retreat impossible. Although this insubordinate and mutinous conduct would have justified extreme measures, yet I rightly decided that I could rely on the loyalty and discipline of the party, and, by refraining, retain the medical services which would be so essential in case we failed to reach a relief station.”

“September 15th.—Sergeant Israel’s observation to-day gave $79^{\circ} 1.8' N.$, a most discouraging latitude, as it is a mile north of the point where the steam launch was abandoned. The southwest gale continues with diminished force, and the temperature rose to 26° ($-3.3^{\circ} C.$). Our drift has been steadily to the northeast, and we are twelve to fifteen miles east of Cape Albert.

“Later.—From bearings this evening, Sergeant Israel places us seventeen miles northeast of Cocked Hat Island on the Littleton Island meridian. The temperature rose to nearly 30° ($-1.2^{\circ} C.$), and the sleeping-bags in the tepee where I am quartered are nearly all saturated from the melting ice. Dr. Pavy moved his sleeping-bag from the tepee to-night to the sledge, where he has more comfortable quarters.”

“September 16th.—A fine clear day, with high temperature,

the thermometer registering 20° (-6.7° C.) at 1 P.M. Our latitude at noon was $79^{\circ} 0.7'$ on the Littleton Island meridian, a gain of over a mile due south since yesterday. I called the officers and two sergeants together this morning. Dr. Pavy recommended starting at once to the southwest, but the rest of the party concurred in thinking with me that it was best to remain quiet on a three-quarter ration until the direction of the drift was determined and the routes in different directions had been examined. I sent out Lieutenant Lockwood toward the southeast, and Sergeant Rice and Christiansen to the southwest, to examine the ice. Lieutenant Lockwood returned reporting good travelling and solid floes for a couple of miles to the southeast toward Greenland. About a mile east of us was a lane of water which extended a short distance to the south. The movements of the ice during and since the storm are very complicated. We are now on a very large palæocrystic floe of unknown extent, which, from 5 P.M. yesterday until noon to-day, has been slowly revolving, and in that time has changed its position through 180° azimuth. At present we appear to be drifting to the southwest. In my own opinion, which differs from the others, except Lieutenant Lockwood, who is uncertain, we should next start for the Greenland coast; and, if any chance presents itself, I shall promptly avail myself of it, as once there we are safe. At Cape Sabine our troubles only commence, as few if any of the party believe that we could now cross the straits by boats or sledge. At present we are thirty miles from Cairn Point (Greenland) and nineteen from Cape Sabine, but, while the distance is greater to Greenland, the end in view is now certain of accomplishment if we once land.

“Rice and Christiansen reported any move impracticable to the south or southwest, and we now wait until the ice settles

down. The rotary motion of the floe yet continues, and a movement in any direction might put us, at the end of a hard day's work, so much farther north instead of south.

"We now have nine hundred and ninety pounds of meat, seven hundred pounds of bread, one hundred and fifty pounds of potatoes, twelve pounds of tea, and four hundred pounds of stearine, a proportionate amount of alcohol, and some small stores; in short, forty days' rations, in which time a great deal can be done. About 9 p.m. Jens and Christiansen each shot a small harbor-seal in a water-pool nearly a mile distant, each seal weighing about one hundred and fifty pounds. Both men received the ration of rum with great satisfaction, and Lieutenant Lockwood reports that Christiansen went to his boat whistling on an empty cartridge-shell."

"September 17th.—Weather distressingly cold for our inactive condition; minimum last night, 2.5° (-16.4° C.); 7 A.M., 5° (-15° C.), calm and clear. Christiansen killed a small seal this morning. To-day is Private Whisler's birthday, and in honor of his birthday and Jewell's, which comes upon the 20th, had coffee for breakfast and our last cranberries at a lunch at noon. It may seem a trivial thing to celebrate under such circumstances, but I fancy that the effect on the men's spirits is a good one. Sergeant Israel got excellent observations at noon, giving $78^{\circ} 56'$ N., a drift in a day of three miles to the west and about four miles to the south. This direction of the drift changes my intention of attempting to reach the Greenland coast, which I should now follow out, had the drift been south or south-southeast as yesterday, and we travel to-day toward Ellesmere Land. Our floe continues to revolve in a direction against the hands of a watch laid on its back, and has now turned through 200° of azimuth. Our delay has been improved by repairing the broken six-man and twelve-man sledges; the

latter shows the effect of hauling the whaleboat even two days. We started at 1 P.M., and, by nine hours' hard work on the road, have succeeded in making about two and a quarter miles in a southwest direction. It is to be remarked that we came into our old camp from the northeast and started out to the southwest, but yet, owing to the rotary movement of the floe, we marched out on the same road over the same ice by which we marched in. The travelling to-day was excellent for the most part, but on the last floe was very heavy from the deep new snow. On reaching the floe I should have camped upon it, but it was separated from the one to the southwest by high, dense rubble, with a slight fringe of new ice; and, although the men were very tired, we cut rubble and hauled the boat to the new floe, in order that there should be no uncertainty about to-morrow's travel. We went to our bags after 10 P.M., worn out with the labors of the day. Land looks very near—some say three or four miles, but it must be nearer twice that distance. In order not to discourage the men, who fortunately look on the bright side, I have directed the astronomer to report our exact location to me alone, and I make it known only at suitable seasons when it confirms the hopeful view. Several bear-tracks seen to-day.

“I abandoned to-day, everything which could be spared and was not of vital importance, about a hundred pounds weight, and yet we are hauling about six thousand pounds, which necessitates only two trips however. We keep a telescope and marine glass, all rifles, a shot-gun, all ammunition, records, instruments, food, fuel, and serviceable clothing. Its outer case has been stripped off, reducing its weight, but we still carry the pendulum. I informed the men that I was unwilling, much as I wanted to save that instrument, to lessen their chances of life by hauling it longer, unless all concurred, and that it would be

dropped whenever they wished. Not only was there no objection to keeping it, but several of the party were outspoken in considering it unmanly to abandon it. Such a spirit is certainly most creditable."

Brainard's journal says: "Turned in at 11 P.M., after ten hours of the severest physical strain. As the sleeping-bags (of those of us in the tepee) are protected from the ice by only one thickness of canvas, our comfort can be imagined."

"September 18th.—Called the cooks at 5 A.M.; got off at 7.45 A.M., and camped at 9 P.M., with a short delay to drink tea, which was cooked as we worked. The labor was of the most arduous character, for we worked with a sense that the situation was desperate, as the ice was moving eastward and threatened to pass Cape Sabine. We crossed five lanes of water by boat where three loads were necessary, which involved constant change from sledge to boat and consequent separation of the party. As the pack was moving, such separations were dangerous, but were absolutely essential to progress. One or two of the men at one time commented on their being left till the last party, and in consequence I reproved them, pointing out that they were last only in their turn, and not always so. I have invariably been the last man to enter the boat under such circumstances. Rice to-day broke through the young ice, completely wetting himself. I was with him, and stripped myself of underclothing for him, which was supplemented by other dry clothing as the party came up. When we drank our tea, at 7 P.M., we were on the northern edge of a palæocrystic floe; but, though the men were thoroughly tired out, we all realized the importance of reaching land, and so pushed on for two hours and camped on the southwest edge of the floe, then being, I estimated, about four miles from shore. Darkness set in at that time (9 P.M.), which, with the open water and moving floes ahead,

necessitated our stopping. Almost every one, but Lieutenant Lockwood, Sergeants Brainard and Rice, and myself, has been deceiving himself very much as to the distance to the land, which, indeed, appeared exceedingly near. Sergeant Israel got $78^{\circ} 50.3' \text{ N.}$ at noon to-day, with Cocked Hat Island yet to the south, showing that we must have been at least six miles from Sabine, being yet east of that cape, and certainly four and a half miles from the nearest land. As we travelled the ice drifted east, so that Cape Isabella showed between Brevoort Island and Cape Sabine. The men were so exhausted when we camped that no preparation of tepee or sails was made, and the greater part of us slept on the bare ice. As I realize the great importance of protection while sleeping, this speaks for our condition."

"September 19th.—A wretched, wretched day. Shortly after midnight the wind strengthened to a southwest gale, which was so violent at 7 A.M. that I directed pemmican and water to be served to the men in their bags, instead of their regular breakfast; and followed the same arrangement for supper. The wind was so violent that Sergeant Israel was unable to get latitude observations at noon, but we realized only too clearly that a second time we had been blown into the middle of Kane Sea. At 6 P.M. Cape Isabella and the western shore showed up very plainly, indicating that we have drifted four miles east since morning. The cape and land opened up rapidly and suddenly with the falling tide, which carries us south. At 5 P.M., from bearings, we were in $78^{\circ} 52'$ or $53' \text{ N.}$, from twelve to fourteen miles east of Sabine, seven miles west of Cairn Point, and about on the meridian of Cape Alexandra. I then invited the officers and two of the sergeants to give their views in regard to future movements. In answer to my request, they all expressed the opinion that there was a chance of reaching the

west coast if we drifted by Cape Sabine, which I thought to be very doubtful. I expressed my opinion that the proper course was to abandon everything but two thousand pounds selected baggage, including records; and, with twenty days' complete rations, start across the moving pack for the Greenland shore, about twenty-three miles distant. In such case the party could haul everything in one load, and transfer by boat in two loads, which would insure our making twice as great a distance in a day as with our present loads. I pointed out that the Greenland coast was the only one where positive relief could be expected, that Cape Sabine, at four miles distant, showed that no party was there and presented nothing certain. I considered it almost impossible to travel twelve miles west while the current was carrying us nine miles to the south, as in three days we had travelled only four miles west and had drifted twelve miles to the south, thus making two-thirds of a mile westing to each mile southing. On the other hand, we had to travel only seven miles east to reach Cairn Point in twenty-two miles southing, two miles to catch Littleton Island in thirty-one miles southing, and had half a mile easting to spare to make Cape Alexandra in thirty-five miles. All recommended not moving until the floe and drift had set down—to await a favorable opportunity. Dr. Pavy was unwilling to abandon anything, unless twenty days' rations and sleeping accommodations for nine men could be carried in the boat—an impossibility. Sergeants Brainard and Rice thought great chances could be taken toward Greenland. Lieutenant Lockwood was unwilling to give a decision but favored delay. I said I considered all delays dangerous, but in deference to their opinion would not move till to-morrow, depending on our noon observations to determine the direction of our drift in the meantime; but, unless our surroundings, such as new ice, etc., prevent moving, I shall start in the direction

seeming best, which will probably be Greenland. I called attention to the continued criticism on our movements, which, as far as I personally knew, no person had ever attempted to repress. This remark did not apply to Lieutenant Lockwood, Sergeant Brainard, or any of those who had been sleeping in the tepee; but to the other detachment. Dr. Pavy, in his remarks, made a hostile criticism about my not endeavoring to reach Brevoort Island, as he and Lieutenant Kislingbury recommended the other night, and I at once stopped him, when he apologized and withdrew it. Had I listened to his recommendations at that time, he and Lieutenant Kislingbury, with a few others, who would have gone in the first boat-load, would have reached Brevoort Island, while the rest of us would have been left on the floe, as the gale was already setting us off shore at that time."

Our condition during the morning is thus recorded by Brainard: "This morning our sleeping-bags were filled with drifting snow, and saturated with spray from the huge waves that came dashing against the southern edge of the floe on which we took refuge yesterday. As nothing could be done we passed the day in our bags, listening to the roar of the waves and howling winds and reflecting on our helpless condition."

"September 20th.—Sergeant Jewell's birthday, in honor of which we had coffee for breakfast. A very little sugar was given Jewell and Whisler from a small quantity reserved for emergencies.

"In the afternoon Christiansen killed a large bladder-nose seal (*Cystophora cristata*), eight feet four and one-half inches in length, and weighing probably six hundred and fifty pounds. The Eskimo were considerably excited over this seal, and were very much elated at killing it, as, from their remarks, it is a rare seal along the Greenland coast. A dense fog, with occa-

sional snow, prevented our moving to-day, and made it impossible even to determine our position. I should certainly have moved had it been possible to see land in any quarter. There has been much water around the floe to-day, and the pack has evidently loosened up very much, but the temperature was down to 11° (-11.7° C.) last night, and young ice formed around the edge of our floe. During a break in the fog a bit of land showed up for a few minutes, which was thought to be Bre-



Brevoort Island, off Cape Sabine.

[*June*, 1884.]

voort Island, and bore 12° south of west. Snow, fog, cold, and hunger, added to our mental anxieties, render us exceedingly wretched; but, strange to say, our spirits are good."

Brainard writes: "We are now carrying burdens which would crush ordinary men, but the texture of the party is of the right sort, and adversity will have very little effect on our spirits."

"September 21st.—Jens shot four small harbor-seals to-day, three of which were secured. We are cooking with stearine,

and Private Bender, in the tepee, being affected by the smoke, I transferred him last night into the Beaumont, in place of Connell, who objected to exchanging a dry, comfortable boat for the ice. This evening, Connell being attacked with diarrhoea, I returned him to the boat, and brought Corporal Salor to the tepee. Snow fell the entire day, wetting all the bags in the tepee through, except possibly Doctor Pavy's and Lieutenant Lockwood's. I am exceedingly uncomfortable, but Cross and the Eskimo are even more so. Rice's party, which, since the abandonment of the whaleboat, have been sleeping on the sledge, passed a wretched night, and have to-day put up an ice-hut, which will at least protect them from the snow. I suggested that they could come into the tepee, which they declined, as it would not have much improved their condition, and would have made us yet more uncomfortable by crowding us. They are covering their house with a sail, which will insure more comfort. Lieutenant Kislingbury and the men in the boat are dry and very comfortable. The temperature was up to 26.5° (-3.1° C.) to-day. Sergeant Cross' foot, which was slightly frost-bitten a few days since, is worse to-day. The doctor dressed it, but complains that Cross does not take even the most ordinary precautions regarding it. Seal-blood is much in demand, and seal-blubber partly tried out is found palatable. Schneider has been making himself useful in making canvas boots, which supplement our insufficient foot-gear. I have only one pair of boots (seal-skin), and long since gave away my moccasins."

"September 22d.—Sergeant Israel's bearings made our position this morning directly north of Cairn Point, and in latitude $78^{\circ} 54'$; and at the meridian observation, which was somewhat uncertain on account of the lowness of the sun at noon, we were in $78^{\circ} 52.6' N$. Our abandoned whaleboat was seen on a

floe this morning two miles to the southwest, a fact which caused great excitement. Sergeant Rice, with eight men, tried to reach her, but failed to get nearer than two hundred yards. The floe on which they landed and the one on which the whaleboat was situated were separated by pack slush-ice impracticable either by boat or foot. By experiment to-day it was determined that our boat could hold the entire party of twenty-five, and still have a capacity for eight hundred pounds of baggage, in calm weather and smooth water. The Beaumont, which was injured several days since when hauling it through rough ice, was repaired to-day. Jens shot a large seal, but it sank immediately. Four of the men having a touch of the diarrhoea—from seal-blubber the doctor thinks—I changed their diet, giving them corned-beef instead of seal-meat. The temperature fell this afternoon to 8° (-13.3° C.), but cloudy weather and light snow forbid my hoping for zero (-17.8° C.) to-night. Nearly all our sleeping-bags being wet through, we changed the site of the tepee this morning, and made a partly successful effort to dry our clothing. We are decidedly the most uncomfortably situated of the party, as Rice's crew in the snow-house are quite comfortable, and Lieutenant Kislingbury's in the Beaumont especially so."

"September 23d.—During the night we had snow, with a heavy gale, probably easterly, which drove us very near the Ellesmere Land coast again. Yesterday we were twenty-one miles distant from Cairn Point and fifteen from Sabine, but to-day we are about nine miles from land, equidistant from Sabine and Cocked Hat Island. It has been a disagreeable, stormy day with a cold northeast wind, and the temperature has fallen to 8° (-13.3° C.), so that we have suffered much from our forced inaction. The men who were ill yesterday are better to-day; we are all very wretched, however, and, to add to my

trouble, I cut my hand badly on a piece of ice. Our issue of rum, which is discontinued on idle days, alleviated the men's sorrows somewhat, and proved a great benefit to all."

"September 24th.—Wind, at 4.30 A.M., southwest, but changed to north, and then to the northeast. The temperature during the night fell to 4° (15.6° C.). I called the cooks at 6.30, but breakfast was not ready for two hours. A small lane of water showing up, I sent Sergeant Rice to see if it was practicable for the boat. He reported that we could only reach the floe visited Saturday, that we could travel over it, but it would be unsafe to camp upon it. Sergeant Brainard was sent, with Schneider, to determine the possibility of following at once a route to the westward, which had been considered by Dr. Pavy as practicable. They both reported it impossible to move in that direction, when Dr. Pavy became so abusive to Schneider, because he deemed the route impracticable, that I was obliged to interfere. I felt, however, the great importance of making westing, and, despite the discouraging reports, sent Lieutenant Lockwood, Brainard, and seven men, with the ice-boat, to examine farther. They visited the floe already referred to, and two others to the west and southwest, which proved to be of last year's ice, over which travel is impossible with any load.

"They experienced a great deal of danger and trouble, owing to rubble, slush, and rotten ice. In clearing the slush ice in front of the boat, so as to permit their return, our only shovel was unfortunately lost. From bearings, at 9 A.M., we are on the meridian of Brevoort Island. The fresh northwest wind which set in is undoubtedly carrying us to the eastward, and will be exceedingly dangerous to us if it continues, but movement in any direction is yet more perilous. We have done our utmost, and must now rely on Providence."

"September 25th.—I called the cooks at 4.30 A.M., but we could not move owing to a northeast gale, with snow, with a temperature of 10° (-12.2° C.). I anticipated this delay from the continual grinding of the ice last night. The pressure of the pack was exceedingly heavy, and it was fortunate that we were on a palæocrystic floe, and had not ventured on one of last year's ice. About 1 P.M. the pressure of two large palæocrystic floes split our own in two, leaving us on a small bit of the original floe, which is only two to three acres in extent and from thirty to forty feet thick. The main floe drifted away before we could transfer to it. Our situation now is extremely critical, as the wind shifted an hour ago (3 P.M.) to the northwest, and is increasing in violence, so that we are slowly but certainly being set off shore toward the centre of Smith Sound. We are now (4 P.M.) distant about three miles from Brevoort Island, in a northeasterly direction, and must certainly drift past it if this wind, as is probable, holds. Several of the party are troubled with diarrhoea, and Cross reports his second foot frosted so that he is unable to do any pulling.

"Later.—The wind increased by 6 P.M. to a violent northwest gale. About that time we crowded up against a palæocrystic floe to the west, from which we are separated by huge masses of slush and rubble ice for about an eighth of a mile. I sent Christiansen to attempt a crossing, in hopes that there might be a chance of our passing to the floe. He got over with great difficulty, and in returning nearly fell through several times.* To attempt such a passage with our loaded sledge would be madness. At 10 P.M. total darkness came, but as the

* The fine, broken ice, called slush, and rubble ice was occasionally held so firmly together by the pressure of floes as to permit a man to cross upon it. In this case the pressure was hardly sufficiently strong for that.

storm yet increased in violence and the entire destruction of the floe was feared, I detailed a watch, which was only able, however, to report our continued south-southeast drift, and that we could land at Breevort Island at early dawn if the wind died down."

"September 26th.—At 8 A.M. we were several miles east of Stalknecht Island, drifting rapidly southward. Dr. Pavy thought something might be done toward reaching shore. Though I did not agree with him, I directed Rice and Schneider, the most experienced sailors of the party, to examine the strip of water to the westward. They reported there was such a sea in the small pool that a boat could not live in it, and such heavy waves were breaking that they could not reach within fifteen or twenty feet of the edge of the ice, while on the other sides our floe was being steadily ground into fragments. Rice was ordered to keep watch of the opening, and later he reported slush ice so thick between the edge of the floe and the open water that a well-manned boat could hardly have gotten through it, even without a load. As it was calculated that nine hours would be necessary to have landed the party, it is evident what would be the fate of the party left behind if I consented to a trial.

"Lieutenants Lockwood and Kislingbury and five others are affected by diarrhœa, so, after consultation with the doctor, I have decided to change the diet to salt meat.

"1 P.M.—A large palæocrystic floe is crowding us badly, and has cracked our floe repeatedly. I feel obliged as a matter of prudence to move to the floe north of us, although it is now blowing a gale and the passage from this floe to the other over the rubble ice must necessarily be dangerous, entailing possible separation and loss of men and supplies. It also obliges the whaleboat crew to abandon the ice-house, which has afforded them excellent shelter."

“Brainard described the condition accurately: ‘The cooks were called long before daylight, that we might be ready to take advantage of any opportunity as the first streak of dawn appeared. But daylight revealed the land fully six miles away, and for a third of the distance the sea was covered with *débris* ice, through which no boat could be forced, and the seething, foaming ocean beyond would have swamped us in a moment.’

“September 28th, 8 A.M.—We have suffered so intensely from exposure that I have been unable to note events since the 26th. As I closed my notes the gale increased in violence, causing such conflict between the heavy floes as it is beyond the power of language to describe. Our own floe, as I have recorded, was from forty to fifty feet in thickness, and yet it crumbled and cracked like chalk under the tremendous pressure of the surrounding floes. As the edges of these immense masses of ice ground against each other, with terrible groanings and almost irresistible force, their margins were covered for several rods with thousands of tons of broken ice, which arranged itself in the shape of irregular mounds, whose apexes marked the margin of the floe. A slight change of direction and the two floes parted, when the mountain of ice dropped instantly into the sea, leaving fringes of ice from ten to twenty feet high along the edge of each floe.

“Just as the whaleboat party quitted their snow-house, one of these repeated shocks, of unusual violence, split our floe again, opening a wide crack, which soon swallowed up a portion of the abandoned house. Even as we rapidly rolled up the tepee, a narrow crack formed under our feet. Fortunately, at that time an immense floe to the northward was setting, with tremendous pressure, against our own floe, from which it was separated by some fifty feet of small rubble ice, that was held together simply by the pressure. The slightest movement of



THE CRUSHING OF OUR FLOE—SEPTEMBER 23, 1883.

either floe would open this rubble so that the sea would swallow up any one on it. It was a hazardous passage, not to be thought of under other circumstances, but in our desperation it afforded the only possible means of escape. With wonderful celerity boat, sledge, and provisions were rushed across the chasm; the articles of least value being left till the last. Even as the last man passed over the rubble the floes moved, and one man just escaped dropping through as the lessening pressure opened again the pack.

“Our condition, as we stood on our new floe, was wretched in the extreme; for, although the temperature was about 15° (-9° C.), yet a northwest wind, with a velocity of nearly fifty miles an hour, not only chilled us to the bone, but filled the air with drifting snow, which insinuated itself even, as it seemed, through our garments. As sheltered a place as possible was selected for our new camp, behind some high, blue-topped hills. The whaleboat crew placed their sleeping-bags on the sledge in the rear of a berg, where they were covered by a small sail. They came to supper with us in the tepee on the 26th, but since that time (forty hours) have remained in their sleeping-bags, with nothing but a small piece of pemmican and a drink of rum, which latter some refused until this morning. They preferred their present great discomfort to the increased suffering which they would have been caused by leaving their bags during the violent gale. The wind and drifting snow continued with unabated violence all the 27th, and though now high, yet lulls occasionally. On the morning of the 27th it was impossible to cook, so a small quantity of frozen pemmican was given to the men in their bags. With great difficulty supper was cooked last evening, at which time the snow which had filled the tepee and covered our bags was shovelled out. The cooking in the tepee made the temperature so high that every sleep-

ing-bag is completely saturated, much to our discomfort. The *Valorous* was filled with snow, but its crew was the most comfortable of the party; all were exceedingly wretched, however, and those in the whaleboat even more so than the rest of us.

“From appearances this morning we are embayed in Baird Inlet, and have not moved over a mile since yesterday morning, and that to the southwest. The channel must be densely packed toward Greenland, since a violent northwest gale forces us to the southwest. A wide lane of water shows up to the westward between us and a large palæocrystic floe, which it is of vital importance for us to reach as soon as the subsiding gale permits. Sergeant Rice, in anticipation of a change, has gone, by my orders, to watch the sea and report when it is low enough to enable the lead to be crossed without serious danger.

“Later.—Sergeant Rice reporting that the sea had gone down, so that it was possible to cross with small loads, I immediately moved the entire party and a portion of our provisions to the edge of the floe, and sent Rice, with our best sailors, to the next floe while we went back for the balance, the sea being so rough and the wind so high that four loads were necessary. It proved to be a large, fine, palæocrystic floe, affording such good travelling that we succeeded in moving everything but the boat in one load to a floe beyond it, which is evidently caught and held fast by a grounded berg. We feel that our miraculous preservation from a drift into Baffin Bay, and the death it threatened, is an intervention of Providence in our behalf. We are prevented from going farther to-night by weak, young ice ahead, and the party are too much worn out to admit of it. I was reluctantly obliged to leave the boat nearly two miles behind us for the night, on the edge of a large floe to the eastward. Our day's work has been prosecuted with extraordinary energy, and insures our reaching land in any event; as, in case of



LANDING AT ESKIMO POINT—SEPTEMBER 29, 1888.

any movement in the floe on which we are now camping, I shall take refuge with the entire party on the large floeberg against which this floe crowds, and under which we now rest. A bold, high, rocky island is the land we seek, hemmed in by glaciers and snow-covered land. As soon as we reached the solid floe, and our safety seemed assured, I detached the two Eskimo as hunters. They have seen several seals, a half dozen walruses, and the tracks of a bear; and, although no game has been obtained to-day, yet we feel confident of the future."

"September 29th.—I called the cooks at 4.30 A.M., and also started Sergeant Brainard, giving him orders to reach land if possible, and return over the same route to us. Land is scarcely more than a mile distant from our present camp. He shortly returned, and reported that he had gone nearly a mile, and had come to a lane of water, adjoining which was young ice not thick enough to bear the sledge. I immediately started the party back, when we brought up our boat, and after breakfast moved toward land. We were obliged to ferry across two lanes of open water, and then were fortunate enough to strike fast ice, extending from us to land, which was nearer three miles than one from camp. Lieutenant Lockwood was in charge of the first party, and touched land at 5.20 P.M., while I was the last to cross the lanes of water and to reach the shore. The point reached is a portion of the main-land, although we have until attaining it thought it to be Leconte Island. Two eider ducks and a raven were seen yesterday, as well as many walruses. A large number of walruses were seen to-day. I have had both of the Eskimo hunting, but they were unfortunate and secured nothing, though Jens succeeded in wounding a walrus on the ice. The men were very tired on reaching shore, being quite exhausted by the efforts made since the storm. The point we are on consists of nothing but immense boulders of

granitic rock, piled one upon another ; but it is solid land, and all are exceedingly thankful to have it under foot once more. No ice-foot exists along this coast, and travel is only possible on the main floe."

Of our long struggle to reach the shore, I can only add that many occasions of great peril came on days so eventful that time and strength failed with which to even allude to them in my diary, and their story can never be fully told.

The retreat from Conger to Cape Sabine involved over four hundred miles' travel by boats, and fully a hundred with sledge and boat ; the greater part of which was made under circumstances of such great peril or imminence of danger as to test to the utmost the courage, coolness, and endurance of any party, and the capacity of any commander. As to my officers and men, it is but scant justice to say that they faced resolutely every danger, endured cheerfully every hardship, and were fully equal to every emergency (and they were many) of our eventful retreat. If adverse and harmful criticism came from the lips of some in seasons of peril and forced inaction, save in one instance alone, I never failed to receive the promptest obedience on march or in action.

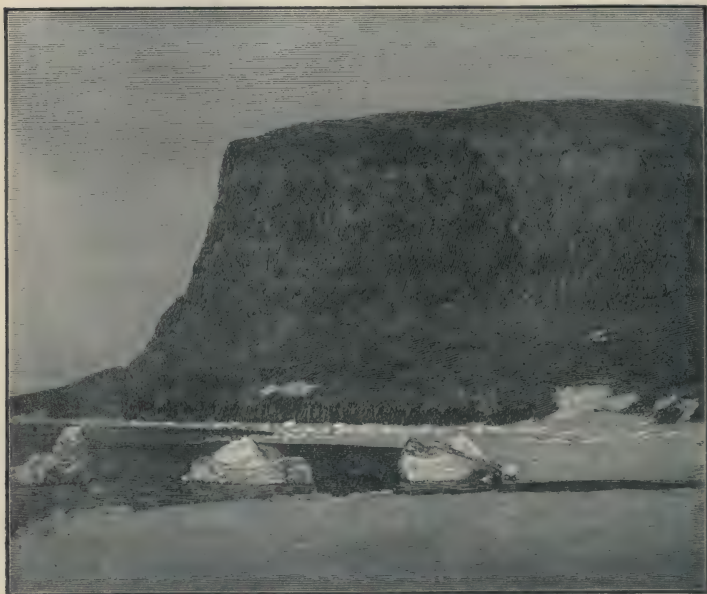
Without doubt all my decisions and orders were not without flaw or error, but I am conscious of no serious one. At all events, after fifty-one days and five hundred miles of travel, I landed near Cape Sabine not only my party, in health and with undiminished numbers, but its scientific and private records, its instruments and its baggage, with arms and ammunition sufficient, in a land fairly stocked with game, to have insured our lives and safety.

CHAPTER XXXIV.

NEWS OF THE PROTEUS.

“**S**EPTEMBER 30th.—Eskimo Jens last evening shot a large seal, which immediately sank; he has hunted all day without success, though he saw many walruses. I sent Corporal Salor and Christiansen to visit the cape on the south side of Rosse Bay, thinking some cache might have been made there if a vessel could not reach Cape Sabine. They returned at 5 P.M., having been unable to get to the shore, owing to a lane of water with moving ice a half mile from the cape. Once during their absence they were on the moving pack, and escaped to the fast ice with difficulty. There was no cairn or signal to be seen on the Cape. Salor brought in a sea-cucumber and a clam, or mussel, such as walrus feed on. Expecting that Corporal Salor would reach the shore, I issued orders to Lieutenant Lockwood to prepare for a trip to Cape Sabine to-morrow with the twelve-man sledge. Corporal Salor's experience proved the impracticability of such a trip, and I countermanded the order. Sergeant Rice then proposed to take a one-man sleeping-bag, and endeavor, with Jens, to reach Cape Sabine on foot. I gave the necessary orders for his outfit and journey, and prepared records which were to be left in the cairn at Brevoort Island. I climbed the promontory, a huge mass of crags without a vestige of vegetation, at the base of which we were camped, and found it to be about eight hundred feet high. From its summit the only water in sight were a few continually changing lanes to

the east and southeast. The day was so clear that I could not only see Cape Alexander plainly, but also Wostenholme Island, nearly eighty miles distant. Beyond I was uncertain, and doubtful as to the identity of the high land back of Cape Parry. To the north of Cape Alexander was visible the indentation known as Life-Boat Cove, in which the abrupt, rocky summit



Cape Parry.—June, 1884.

[From a Photograph.]

of Littleton Island attracted my attention. Was there a relief party at the appointed place, and would we be able to reach them or they us? On these contingencies our future safety seems to depend."

"October 1st.—We are camped on a point a short distance above Wade Point and just below Alfred Newton glacier. Lieutenant Kislingbury hunting, crossed the glacier to Rosse Bay,

which he found to be open for half its extent. He reports the Admiralty chart the better of the two we have. Both he and Salor say that Leconte Island is very small, and is situated off the northern end of an off-shoot of Lefferts glacier. Lefferts glacier in the main discharges into Rosse Bay, but offshoots come into the south of the bay, being turned by the promontory. I examined several sites for permanent winter quarters, but found none which was really good, though we shall probably move to a low plateau on the south side of Alfred Newton glacier and about a mile distant.

"Rice and Jens started, at 8.40 A.M., for Cape Sabine, taking with them a record to deposit in the cache. They carried with them a large single-man sleeping-bag, into which the two can barely crowd, and four days' rations, expecting to subsist at Cape Sabine and during their return upon the English supplies at that point. They go over glacier, by the overland route discovered by Lieutenant Kislingbury, to Rosse Bay; thence by glacier or land as may be practicable. Ellis and Whisler, who assisted them with their packs, returned about 6 P.M., having gone as far as Rosse Bay, where the southerly gale was very violent. Sergeant Rice sent back word to me not to be alarmed if he was not back until October 9th. The gale which sprang up last night has opened the straits very much, but gives us very bad weather, bringing with it such relatively high temperature (about 26°, or—3.30 C.) as to melt the snow and ice under us and saturate everything. We have, owing to the gale, remained in our bags most of the day.

"Sergeant Gardiner's finger causes him such great pain that he is hardly able to sleep. I am obliged to give him special diet, and an extra allowance of bread and butter, to which he reluctantly consents. He injured his finger severely during the retreat, and constant use prevented its healing; and finally, his

extremely arduous labors with an oar the day we landed so aggravated its condition as to induce a felon, which the doctor says may cause the loss of the finger.

"Long killed a walrus in a water-pool, and was able to touch him with a pole, but unfortunately could not get him within reach before he sank. This encourages us, as we could live through the winter if we could secure a couple of walruses. I decided to remain here for the present, and so I sent the officers and Brainard to examine and report on the various projected sites for our winter huts. They unanimously agreed that a point just south of Alfred Newton glacier would be the best.

"If we had a second boat, I should not hesitate as to the course to be pursued. I should here cache our instruments, records, and all other articles not indispensable for a boat journey, and follow this coast (Ellesmere Land) south to Clarence Head; whence it is but fifty miles (by our chart) to the Cary Islands, where we would be safe. If ice prevented that passage, it would be but seventy miles farther, with prospects of open water, to North Devon, where the Pond Inlet natives are occasionally to be found. With one boat this idea is futile, however; and, during Rice's journey to look for succor or provisions, I deem it best to build permanent huts, while our hunters, searching for game, may obtain two or three walruses, which would insure our safety here. With the latter view, Bender is now trying to fashion a harpoon head from a piece of my sword, with which to kill and secure them. On abandoning the launch we brought along an assortment of tools, which, in the hands of our skilful mechanics, are sufficient for the making of all essential articles.

"The sun is so low in the heavens, even at midday, that Israel could not get our latitude to-day."

It may seem strange to uninformed readers, that my diary

in those days makes no mention as to the non-feasibility of crossing Smith Sound to Littleton Island, and the expected relief party or the Etah Eskimos. The impossibility of such a passage was so patent to every one, that not even the most querulous and unpractical of the party ever suggested it. The conditions were as follows: Smith Sound in shape resembles a partly opened fan, the open part to the southward, and has a southerly running current of four to eight miles per day. Our experience of eighteen days had proved that, even when working for our lives, we could not average more than two miles daily across a moving pack. The chances of crossing a channel twenty-five miles wide at the narrowest part, by travelling two miles to the east and drifting four miles to the south, where the channel soon became fifty miles wide, are obvious. The conditions which prevented twenty-five active men, who had just passed successfully through an experience of over four hundred miles of ice navigation, from considering this alternative were, first, strong tides, rising and falling from ten to twelve feet every six hours, disrupting and twisting the pack in all directions; second, the character of the pack itself, as it consisted of infrequent palæocrystic floes, with much rubble and slush ice; third, continued strong gales; fourth, the constantly forming new ice, which was sufficiently strong to impede the passage of boats and speedily cut them down, while it was not sufficiently strong to bear the weight of either boat or man.

On October 15, 1872 (two weeks later in the year), thirteen of the crew of the *Polaris*, nearly all able-bodied and first-class seamen, were stranded on a floe in sight of our camp. Though only five miles from shore, the report of the investigating board of the Navy says: "They made several attempts to reach the land with their boats, but failed, notwithstanding their most persistent efforts, owing to the obstruction of the

ice and the violence of the wind." With the aid of Providence we had once made shore, eleven miles distant, in these very waters; and all concurred in avoiding a second Polaris drift, which could hardly have resulted in the arrival of a second Tigress at an opportune moment.

"October 2d.—Three foxes were seen this morning, and one yesterday. Five shots have been fired at foxes with no result, save to alarm them. In order to husband our ammunition and insure our obtaining game, I have ordered that the two Eskimos, Lieutenant Kislingbury, and Private Long be considered as the hunters, and that others should serve only on special occasions. The southerly gale continues in the straits, but the wind here is now quite feeble. Although the day was bad, and the ice over which we were to travel slushy, and possibly dangerous, I decided to move the party to the site recommended by the officers for camp, which I have examined and determined on. Everybody appreciates the importance of being in quarters at the earliest moment. I find that we now have rations for thirty-five days, of about the same nutritive value as those lately issued; *i.e.*, ten ounces of bread, one pound of meat, and two ounces of potatoes—thirty ounces of solid food, about half an Arctic ration. I count on two hundred and forty English rations at Cape Sabine to supply food for an attempt to cross to Littleton Island, in case absolute starvation drives us into the pack. The southerly current forbids all hopes of reaching Greenland, though we might possibly make the Cary Islands. There was much water in the straits last evening, and a lane extended as far as could be seen, about ten miles, toward Littleton Island, but by nine o'clock the flowing tide filled it from the south.

"The men were all consulted by me yesterday, and in general wished that these thirty-five days' rations should be made to

last fifty days. There was much discussion over the matter, as the doctor was unwilling to commit himself to any definite reduction—a course which is embarrassing to me. Finally, I decided to cut down the bread and potatoes, and shall issue, for forty-five days (making a farther reduction after we are in winter quarters), a ration of six ounces of bread, two and a half ounces of potatoes, twelve ounces of pemmican or bacon (or, in lieu, one pound of seal-meat or twelve ounces of corned-beef), and one ounce of extract of beef. Of course, we expect to add to our supplies one hundred and forty pounds of meat from Cape Isabella, and the supplies which I believe our own Government must have landed on this coast for us. At the worst, we have food enough to wait until November 16th for the straits to freeze over, and I believe we shall be able to tide over the year 1883 in any event.

“ We moved part of the camp, with rations for several days, to a point about five hundred yards south of Alfred Newton glacier. I was obliged to reprimand Elison severely, in the presence of the party, for reflections made by him upon Lieutenant Lockwood, in my absence, and which Lieutenant Lockwood brought to my notice. Elison afterward deprecated the language used by him, and plead in extenuation what others had said. This indiscretion, on the part of one of my best men, illustrates forcibly the demoralizing influence of the improper criticisms already made by his superiors. High water to-day, the moon being full, at 11.40 A.M. (W. M. T.); watch probably three or four minutes fast. We pitched the tepee in our new camp, in which twelve slept. The Valorous party, with Lieutenant Kislingbury, occupies the boat. Gardiner is suffering very much from a felon, and in consequence I gave him my sleeping bag, and allowed him to take my place in the tepee, where he will be sheltered from the weather. I take his place with

the whaleboat party, in a bag with Jewell and Rice. I gave the rest of the whaleboat party an opportunity of trying to crowd one three-man bag into the tepee, and to put the others in the *Valorous*. They preferred, however, sleeping out, until a house can be put up, rather than crowd in and make the other parties miserable; and, in consequence, we are lying on a naked rock, unprotected from wind and snow."

"October 3d.—I selected a general site for building; and, as there was a variety of plans proposed for constructing the houses, I permitted each squad to build its own house in accordance with its own ideas. The party is divided between three houses—my own, Lieutenant Kislingbury's, and Sergeant Brainard's—in assignments to which the wishes of the men have been consulted as far as was practicable.

"The boat, with two oars, rudder, and boat-hook, was disposed of by lot, and fell to Sergeant Brainard's party. I ordered that it should be so used, in constructing the houses, that its future serviceability should not be impaired. Everybody worked very hard and cheerfully during the day. My own party will first put up an ice house, and then construct a stone one inside. The others have decided to build stone houses first, and then surround them with ice. Our house will be eight feet by eighteen in the clear. We nearly half finished our ice house to-day. Many Eskimo caches and a number of relics have been found in and around these permanent houses. Among other articles was a toggle of walrus ivory for dog-traces, a narwhal horn, and large bones of the whale. Light snow and a north wind. Much open water in Smith Sound. A snow-bunting was seen to-day."

"October 4th.—Our ice wall is substantially done, and the stone wall commenced. Stopped work at 2 P.M., and hauled a load from our old camp. The temperature to-day has been down to

6° (−14.4° C.), and at 4 P.M. was only 8° (−13.3° C.). In accordance with the doctor's advice, I increased the ration, commencing this evening, to four ounces of pemmican, eight ounces of bread, and one and a half ounces of potatoes, which is to last until we are through with the present hard work. The hunters are not working upon the houses, but are out for game. Long saw many walruses in the straits, all in the open water."

Our condition at this time is perhaps best indicated by an extract from Lieutenant Lockwood's diary. He says: "Our tea is extremely weak. This is a miserable existence, only preferable to death. Get little sleep day or night, on account of hard sleeping-bag and cold."

Lieutenant Lockwood's remark about weak tea recalls the device by which our tea was made to last. As soon as one-half was issued, Sergeant Brainard advised me, and I reduced the ration one-half; and repeated the reduction until the tablespoonful at first allowed daily to each man had fallen to one-eighth of that amount.

"October 5th.—Very hard work on the huts until 2 P.M., when I, with most of the party, hauled in the balance of the articles from the old camp.

"Our house has its stone walls nearly completed. Four ptarmigans, flying from the north, alighted near the camp, and were shot by Cross this afternoon."

Lieutenant Lockwood says: "We have now three chances for our lives: First, finding American cache sufficient at Sabine or at Isabella; second, of crossing the straits when our present rations are gone; third, of shooting sufficient seal and walrus near by here to last during the winter. Our situation is certainly alarming in the extreme. Lieutenant Greely is sleeping out, while Gardiner is occupying his bag in the tepee. We find it very severe work building with these rocks. We are all

weak, and the rocks are granite, very heavy, and not easily obtainable."

"October 6th.—Divided this morning between the three parties the canvas, oars, poles, etc., which were arranged as equitably as possible in three piles by Lieutenant Kislingbury and five others. In order to avoid any chance of complaint, I had my immediate party take the last choice, so Lieutenant Kislingbury and Private Schneider drew lots for the first choice. We have placed a canvas temporarily on our hut, and are now in it. Israel accused Brainard of unfairness in dividing the canvas and other articles, for which I reprimanded him, pointing out how thoroughly he was in the wrong, and he seemed to regret his words. It is his first indiscretion since his services with me, and can be readily attributed to his nervous frame of mind, growing out of hard work, insufficient food, and severe exposure, which affects him, the youngest and weakest of the party, more than any other. Two seals were shot to-day, but only one secured—that of Christiansen, which weighed about one hundred and fifty pounds. We are cooking with stearine, the fumes of which seriously affect our eyes and lungs. The huts have been built of heavy stones, which, with bare hands, we have been obliged to dig from the snow and ice, and carry in our arms to the site. My hands are bruised, bleeding, and swollen, joints stiff and sore, clothing badly torn, hand-and foot-gear full of holes, and my back so lame I cannot stand erect. The work has taxed to the utmost limit my physical powers, already worn by mental anxiety and responsibility. All the officers have worked with the same assiduity and constancy, except Lieutenant Kislingbury, the hunter, who also labors zealously at times when not hunting."

"October 7th.—Mrs. Greely's birthday; a sorry day for her and a hard day for me, to reflect on the position of my wife and children should this expedition perish as did Franklin's.

However, I hope in faith that we shall succeed in returning. We will at least place our records where our work will live after us. I drank Mrs. Greely's health in a half gill of rum, which I had saved from previous issues. Israel to-day apologized to me in a manly, touching way, and in words which were very affecting, for his injustice to Brainard. Reprimanded Salor for his part in recent complaints, for which he expressed the most sincere regret. Was also obliged to take Connell seriously to task for frequent and similar expressions of discontent. I told Sergeant Brainard that I had most implicit faith in his fairness, equity, and impartiality in the issue of rations, as well as in other matters; indeed, I think him a model of fairness. We are now housed, having four inches of moss under us, which we collected with great difficulty from under the snow. The walls are also chinked with moss. I expected Rice and Jens back to-day, and sent Ellis and Whisler, without success, to Alfred Newton glacier to meet them. Long and Christiansen shot a walrus on the ice; but, to their despair, the animal had just life enough to crawl into the water. Christiansen shot a ptarmigan."

"October 8th.—I am very anxious about Rice, owing to the recent bad weather, and its being impossible to reach him with a sledge. Our party collected a large quantity of moss for the roof, and also added more to our bed. Christiansen shot two seals, which unfortunately sank before they could be reached by kayak. A cunning fox stole a little bread last night."

"October 9th.—Lieutenant Lockwood's birthday. It was occupied by us chiefly in collecting moss. I visited the Alfred Newton glacier this morning. It projects a considerable distance into the sea. I find that the pieces detach themselves by flotation, and not by falling. Its highest face above the sea was thirty feet, and the lowest three feet. There was a large floe,

about eighteen feet out of water, in front of the centre of the glacier, from which it had evidently detached itself lately.

“Later.—An eventful day. Sergeant Rice, whom Lieutenant Kislingbury had gone over the glacier to meet, was reported returning, from the front of the glacier. As he said, he brought both good and bad news. The *Proteus* sank July 24th, this year. Her crew and Lieutenant Garlington had gone south, hoping to meet the United States steamer *Yantic* or a Swedish steamer. There are about thirteen hundred rations at or near Sabine. Rice also, wonderful to say, found our whaleboat at Payer Harbor, safe and whole, the floe having caught between Cape Sabine and Brevoort Island as it drifted southward. Rice reached Payer Harbor by a tortuous route around a strait [Rice Strait], which connects Rosse Bay and Buchanan Strait; thus separating Cape Sabine from the main-land, and making it an island (Bedford Pim Island). Rice accomplished most successfully this dangerous and difficult trip, and found a practicable sledging route on his return. I have decided to move to Sabine, abandoning our winter quarters here. It is impossible for us to haul the ten to twelve thousand pounds of articles at Cape Sabine to this place, as I could wish. Our chances for game are superior here, but we look for possible assistance at that point. I am so thankful to be assured of the health of my wife and children, from the note ‘Your friends are all well,’ of the records of 1882 and 1883.

“These records make our fate seem somewhat brighter, and the party are in very high spirits over them, feeling certain we can get through somehow. I, however, am fully aware of the very dangerous situation we are now in, and foresee a winter of starvation, suffering, and probably death for some. The question is, did the *Yantic* reach Littleton Island; if so, we are safe. Our fuel is so scanty that we are in danger of perishing

for want of that alone. I am determined to make our food last until April 1st, and shall so divide it; supplementing it from any game that we may kill. Rice discovered three caches—the English one of two hundred and forty rations, the Beebe cache of 1882 (containing boat), and the wreck cache of the Proteus. He and Jens killed a fox while absent. I have ordered Lieutenant Lockwood to start to-morrow morning, with the twelve-man sledge, and haul a load of our supplies to Rosse Bay, expecting to haul the balance on the day following.”

The record brought back by Rice comprised a notice of the proceedings of the Beebe expedition of 1882, and the following notice from Lieutenant Garlington, as to the loss of the Proteus and his intended movements:

UNITED STATES RELIEF EXPEDITION,

CAPE SABINE, July 24, 1883.

The steamer Proteus was nipped midway between this point and Cape Albert, on the afternoon of the 23d instant, while attempting to reach Lady Franklin Bay. She stood the enormous pressure nobly for a time, but had to finally succumb to this measureless force. The time from her being “beset” to going down was so short that few provisions were saved. A depot was landed from the floe at a point about three miles from the point of Cape Sabine as you turn into Buchanan Strait. There were five hundred rations of bread, sleeping-bags, tea, and a lot of canned goods; no time to classify. This cache is about thirty feet from the water-line, and twelve feet above it, on the west side of a little cove under a steep cliff. Rapidly closing ice prevented its being marked by a flag-staff or otherwise; have not been able to land there since. A cache of two hundred and fifty rations in same vicinity, left by the expedition of 1881; visited by me and found in good condition, except boat broken by bears. There is a cache of clothing on point of Cape Sabine, opposite Brevoort Island, in the “jamb” of the rock, and covered with rubber blankets. The English depot on the small island near Brevoort Island in damaged condition; not visited by me. Cache on Littleton Island; boat at Cape Isabella. All saved from the Proteus. The U. S. steamer Yantic is on her way to Littleton Island, with orders not to enter the ice. A

Swedish steamer will try to reach Cape York during this month. I will endeavor to communicate with these vessels at once, and everything within the power of man will be done to rescue the brave men at Fort Conger from their perilous position.

The crew of the *Proteus* consisted of Captain Pike and twenty-one men ; my own party of Lieutenant J. C. Colwell, U.S.N., Acting Assistant Surgeon J. S. Harrison, five enlisted men of the line of the army, two Signal Service men, three Newfoundlanders, and two Eskimos.

It is not within my power to express one tithe of my sorrow and regret at this fatal blow to my efforts to reach Lieutenant Greely.

I will leave for the eastern shore just as soon as possible, and endeavor to open communication.

E. A. GARLINGTON,

First Lieutenant, Seventh Cavalry, A.S.O., Commanding.

This record speaks in varying ways ; but to the party and to me it meant that we could rely upon it that "everything within the power of man" would be done to rescue us, and on the strength of that promise I at once decided to proceed to Cape Sabine and await the promised help. My journal shows that I looked forward to privation, partial starvation, and possible death for a few of the weakest, but I expected no such thing as an abandonment to our fate.

We now had four boats, and, although the sun was about leaving us for the winter, we could yet travel southward, there being open water visible at Cape Isabella. Had I been plainly told that we must now depend upon ourselves, that trouble and lack of discipline prevailed among the *Proteus* crew, that the *Yantic* was a fair-weather ship, and that its Commander and Lieutenant Garlington were acting independently of each other, I should certainly have turned my back to Cape Sabine and starvation, to face a possible death on the perilous voyage along shore to the southward.

CHAPTER XXXV.

GOING INTO WINTER QUARTERS.

“OCTOBER 10th.—Called the cooks at 4 A.M., but the fast-falling snow prevented the party moving. I spent a half hour over the “Army Register”—which is the only thing found by Rice containing news—and succeeded in glean- ing a great deal of information from it, including important railway extensions, such as the completion of the Northern and Texas Pacific railways; Garfield’s probable recovery; and an extraordinary state of political affairs, which kept Congress in session until August 7th. Rice proposed that I permit him and Christiansen, with a sleeping-bag, to go to Isabella, in the hope, that the Yantic has left supplies there for us. It is a dangerous, and will be a very trying, trip; but, although not anticipating much from the journey, I decided to send him to-morrow.”

I did not then believe that the Yantic had reached Littleton Island, not realizing that any officer of our navy could leave Smith Sound under the circumstances without cacheing one ounce of provisions, even though he “had no fears for Lieutenant Greely, who, living in a region reported well stocked with game, had economized his provisions.”

“October 11th.—Rice started at 5.30 A.M. for Cape Isabella, and Lieutenant Lockwood’s party for Rosse Bay. I went in the drag-ropes with the latter party for two miles, until the late members of the party caught up with the sledge, when I returned to the camp, examining again the Alfred Newton

glacier on my way. The temperature fell to -7° (-21.7° C.) last night, and was -4° (-20° C.) when the party started this morning. We leave here, for an emergency and in serviceable condition, the ice-boat and oars; which, indeed, we could hardly haul. Travelling was quite good, and Lieutenant Lockwood's party was back at the camp at 3 P.M. Cross took advantage of the party's absence to get under the influence of liquor, which he succeeded in obtaining somehow without the knowledge of Bender, who was looking after it. What can be done with such a man? Two foxes shot at this morning without success, but Long killed a seal, which is about the same size as the last, one hundred and forty pounds gross."

"October 12th.—Started at 8.15 A.M. for Cape Sabine, with the twelve-man sledge, the temperature then being -8.5° (-22.5° C.). The minimum last night was -12.5° (-24.7° C.). At half past two the party reached the cache made by Lieutenant Lockwood yesterday, and went into camp, the weather being threatening at that time, although it had been previously clear and calm. While the travelling was fairly good, the load was so heavy that the party was thoroughly exhausted when they reached camp. I had myself pulled so hard that I could hardly stand, and others were in nearly as bad a condition. We travelled about six miles during the day. We were fortunate enough to find water in a small lake near the camp. Dr. Pavy and Lieutenant Kislingbury were extremely urgent that the rations should be largely increased, advising the English sledge ration, which contains about forty-two ounces of solid food. Although realizing the need of it as thoroughly as any one, I could by no means consent to this large increase, but finally fixed it at twenty-seven and one-half ounces, of which sixteen are meat. Rum was issued this evening, and will be during continued hard work on such low diet."

“October 13th. — Lieutenant Kislingbury and Dr. Pavy this morning strongly urged my abandonment of everything which cannot be hauled at one load, saying that it could be brought up later in the season, and that the party in their present condition could not stand the exertion necessary to haul everything. I declined to follow their suggestions, stating that I was unwilling to abandon either records, instruments, or any part of our provisions, until I was certain of being on the island where the three caches were situated. In consequence, we made two loads and three journeys as usual. Crossed Rosse Bay, and camped at the extreme southeast point of Rice Strait, travelling fifteen miles and making good five miles. We worked eight hours on the road, and about two more loading, beginning before light and ending after dark. The travelling was better than I anticipated, and in consequence we got the two loads across the bay in one day instead of two, as had been calculated. The days are now very short, and we cannot travel, except with difficulty, more than six hours. A very high wind, with a temperature of 3° (-16.1° C.), takes all the little life left in our exhausted men. There was occasional light snow to-day, but the sun showed up for a few minutes, in the shape of a dim red spot, through the fog. There being no soil at the camping-place, we were obliged to sleep upon the rough, uneven rocks, as we did last night. While crossing the bay, we passed at one point within several hundred yards of Lefferts glacier, from which many floes have detached themselves; one being, as I learn from Rice, fully a quarter of a mile square, and at least twenty feet above the sea—in short, a palæocrystic floe. The bay must be very deep, for we passed floes at least twenty-five feet above the water; and as we were near one, an immense mass of ice detaching itself from the foot of the berg, rose swiftly through the water and burst through the

new ice within ten feet of our sledge. The ice was scattered in different directions, causing much alarm at first. If it had come up under our sledge, some one must have been injured. This is a new Arctic danger, even for us, who thought we had already experienced all."

"October 14th.—Called the cooks at 5 A.M., and at 4 P.M., by two loads and three journeys, reached the north end of Rice Strait, about five miles from the previous camp. During the second trip with the sledge, we were obliged to abandon the strait at one point on account of open water, and pull the sledge and load inside the ice-foot for several hundred yards. It was a work of enormous difficulty, owing to high, bare rocks, which nearly ruined the sledge; and the men were thoroughly exhausted by the efforts. We have necessarily run great risks yesterday and to-day in crossing young ice. A single spot too thin would have cost us lives and provisions. Jens spent the day in hunting in the open water of the strait, but killed nothing, although he shot several times. Took up the white fox killed by Rice and Jens on their trip. It had been partly eaten by another fox. We fortunately found water at a little lake near our camp, which ekes out the four ounces of alcohol which *must cook* a day's food. Gardiner's finger has troubled him so much that he is unable to work in the traces, and in consequence I sent him ahead to test the young ice over which we had to travel, much of which would scarcely bear us. As we are now camped on the island (Bedford Pim Island), I decided to-night to cache such articles as cannot be hauled in a single load to our winter quarters."

"October 15th.—The cooks were called about 4.30 A.M., and at 7 A.M., the temperature -2° (-18.9° C.), I left the main party with orders to follow me, and started, with Sergeant Gardiner and Jens, to visit the Garlington cache, and determine the point

at which it would be best to make our winter quarters. I reached the wreck cache in about two hours, and examined its contents as far as was practicable. I was very much disappointed in the contents; there being scarcely a hundred rations of meat, instead of five hundred, as I had supposed from Lieutenant Garlington's record. Passing onward, I visited the Neptune cache, which, covered by a huge drift, had apparently not been disturbed; but, having no shovel, we were unable to uncover its contents. I went down to within a mile of Cape Sabine, and then returned to meet the party. From an examination of the entire coast, it was evident that no better place afforded for quarters than the lake inland from and—near to the wreck cache. About one o'clock I met Lieutenant Lockwood with the party; the sledge had broken down, about four miles from the old camp, by the runner splitting. They were delayed over two hours in repairing sledge and reloading it. The day was clear but cold. Owing to the height of the shore on the south side of Buchanan Strait, the sun never rises at this date above the horizon. We left at our last camp about twelve hundred pounds to be brought up as soon as practicable. About an hour after we reached camp, Rice and Christiansen surprised me by their appearance. Rice reported that he had visited Cape Isabella; that no whaleboat could be found, and only one hundred and forty-four pounds English meat were cached there. The spirits of the party were generally depressed at this announcement, as the greater part of the men were confident that some stores must have been landed at Cape Isabella for us. I have been determined, since landing on this shore, however, to base all plans for the future, as far as is possible, upon such provisions as are actually within our reach. Whatever stores or game we may hereafter find will be an additional guarantee of our future security. Since the Garlington record has misled us regarding the boat at

Cape Isabella, it is an open question whether there is a cache on Littleton Island."

"October 16th.—This was the day on which the sun left us at Conger; but, although we cannot see it at midday, it remains nine days longer above the horizon here, and in that time an immense amount of work must be done by the half-frozen, half-starved party. I sent Lieutenant Lockwood, with a party of eleven men, to haul up the cache made last night, which was done in a little over five hours. He reported the main floe-ice moving at times, and many tidal cracks along the shore. With Sergeants Rice, Brainard, and Gardiner, I visited the Beebe cache, which, with great labor, we succeeded in unearthing from the snow-bank with which it was covered. We found everything in good condition except the boat, which was slightly injured, evidently by a bear. Lieutenant Kislisbury and Jens visited Cape Sabine while we were thus employed. Elison and one or two other men were left in camp to put up a temporary shelter, which we found ready for occupancy on our return. Although a wretched shanty, we were very glad to avail ourselves of it, as a cold northeast wind, with drifting snow-storm and a temperature of 3° (-16.1° C.), caused us to be thoroughly chilled and uncomfortable. Got some Medford rum from the cache, and issued a half gill to each man; it was thoroughly appreciated."

"October 17th.—Up at five o'clock, hours before daylight; and, after a poor breakfast, with most of the party I brought up the Beebe cache, including the whaleboat, to our present camp. The last of the cache was in by half past two. The day has been a very cold and uncomfortable one; temperature -6.5° (-21.4° C.), with a strong north wind and snow, which frosted the fingers and toes of several of the party. This exposure would have tried us in our best days, but now it is nearly death to us. Those who were not engaged in bringing up the pro-

visions occupied themselves in improving our camp, which is somewhat better than yesterday, protecting us from the wind at least. A small lake near by affords us water. A raven has been seen for several days following us from camp to camp. With Sergeant Elison and a couple of others of the party, I searched for and selected a site for our permanent quarters. We build at the only place where it is possible to do so, about half a mile from our present camp, on a little neck of land between a fresh-water lake, fed by a descending glacier of Bedford Pim Island, and the sea. There are many loose rocks, which are available for building purposes, and near by are large snow-drifts, from which snow-blocks can be obtained. With great difficulty we partly cleared the site of the house, and commenced its construction by laying the corner-stones. It is to be twenty-five feet by eighteen in the clear. We are having chocolate and coffee, delicious to us all, but in quantity it is aggravating to starving men. Biederbick, troubled with a bad attack of rheumatism; Long, with pains in his chest; and Cross, with frosted feet, comprise our list of invalids."

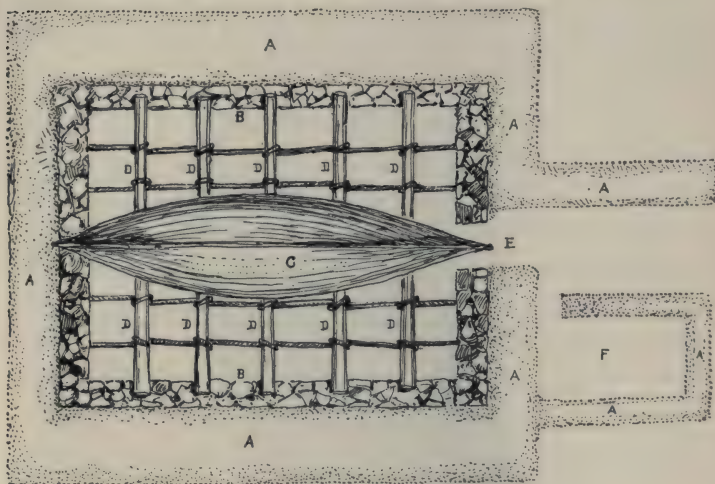
"October 18th.—A wretched, wretched day, with a strong cold wind and drifting snow. The entire party have been at work on the winter quarters, except Long and the Eskimos, who are hunting. The temperature was -6° (-21.1° C.) last night, and but 1° (-17.2° C.) this morning; in consequence several of the men have frost-bitten fingers from the work of yesterday and to-day. My hands are in fair condition, but my heels were badly frost-bitten two days since. Christiansen was fortunate enough to kill a fox to-day. I am feeling badly to-night from a serious blow in the face, accidentally received from an axe-helve too carelessly handled by Whisler, who was energetically assisting me in loosening a rock. In consequence of the cold and pain I can scarcely sleep."

“October 19th.—The whaleboat was brought from our old camp and put on the walls of the house this morning, and a snow wall was commenced around the stone wall already erected. The spaces between these walls are filled in with snow, sand, and gravel. Owing to our short rations, the cold is almost unendurable, and the high northwest wind of to-day has been very trying and disagreeable. The hunters, except Lieutenant Kisslingbury, were out to-day, but got nothing. We were able to work less than five hours, owing to darkness commencing so soon. Our work is either carrying snow-blocks cut from drifts near the glacier, or bags of sand from the hill an eighth of a mile away. Our floor is composed of rocks, many of which we cannot get out, and so it is needful to bring enough sand and gravel to fill in and cover them partly at least.

“We have moved into our hut, glad to exchange our temporary shelter for a place where the wind, at least, will not cut us to the bone. It is time to be in winter quarters; no sunshine ever, and a steady temperature of -11° (-23.9° C.).”

The rock walls of the house were about two feet thick and three feet high, outside of which was an embankment of snow, at first four feet in height, but eventually the winter gales buried the house in snow. The whaleboat just caught on the end walls, and under that boat was the only place in which a man could even get on his knees and hold himself erect. Sitting in our bags, the heads of the tall men touched the roof. Holes were cut in the sides of the boat, in which oars were inserted, which, reaching to the side walls and fastened by ropes, supported the canvas and overlying blocks of snow which formed the roof. The method of arranging the boat, oars, and ropes are shown in the plan, the ropes being secured by very heavy rocks at each end. The scarcity of rocks prevented our building higher walls, and snow-blocks were at first insufficient to build snow-huts. The

only space left free, after twenty-five men, with sleeping-bags, had packed themselves in, was that in the centre, between the dotted lines, where cooking was done, barrels sawed up, and exercise taken on very bad days. The thwarts in the boat were used by the cooks for dishes, provisions, etc. The door, four feet by three, was built into the end wall, and opened out on a passage-way which led to the entrance, over which hung a strip of canvas. The commissary storehouse, and passage, with snow



Plan of Winter Quarters at Camp Clay.

A. Exterior wall of snow. B. Interior wall of stone. C. Whaleboat, serving as roof to hut. D. Oars from which the blade has been sawn connected by cables anchored in stone wall, serving as rafters to whaleboat roof. E. Door to hut. F. Commissary.

walls, were covered by canvas. The barometer and Eskimo lamp were fastened to posts, which, placed in the middle, supported the centre of the whaleboat. The stove was used in common.

"October 20th.—The severe storm of wind and drifting snow, with the temperature down to -13° (-25° C.), obliged

us to stop our work of bringing sand to improve the present condition of the hut. Compared with our previous quarters, the house is warm, but we are so huddled and crowded together that the confinement is almost intolerable. The men, though wretched from cold, hard work, and hunger, yet retain their spirits wonderfully. I broached to-day the question as to what should be our winter ration, but leave the point undecided until the English cache reported damaged by Lieutenant Garlington is visited by us. God only knows what we shall do if it is spoiled, this hut will be our grave ; but, until the worst comes, we shall never cease to hope for the best."



Arctic Owl.

CHAPTER XXXVI.

COLLECTING OUR SUPPLIES.

THE establishment of winter quarters, while an important, was by no means the most important duty which lay before us. It would have been neglected until a later day, but at that time no other work could be done. Three or four hunters kept the field with no success, but the work of collecting the scattered stores at our quarters was not practicable. The Neptune cache, a scant mile to the southeastward, had indeed been brought in with difficulty and danger, as several, myself among the number, had frozen their feet, which had been wet in that work. We had brought in these provisions only by sledging a part of the way overland, as there was no ice-foot yet formed along the rough, rocky coast, and the open water of Smith Sound still extended into Buchanan Strait within a half mile of us.

Our whaleboat, so wonderfully restored to us, was yet on the floe between Brevoort Island and Cape Sabine, while near the cape the cache of clothing, the tea and bread abandoned by the crew of the Proteus, and the English depot remained untouched.

Five days only of sun remained, but the route to Sabine was still impracticable. On October 21st I sent Lieutenant Lockwood, with thirteen others, to Rice Strait, to which point, lying inward, the ice was firm and solid. He took a tent and camp outfit for Long and the two Eskimos, who were to remain at that



OUR HUNTER, SERGT. FRANCIS LONG.

place and hunt as long as daylight remained, while Lieutenant Lockwood was to haul back the stores yet cached there. Long had suffered much from chest troubles at Conger, and during the retreat; but his skill as a huntsman, and his great powers of endurance, caused me to send him in charge of the party, when he expressed his willingness to go. The Eskimos thinking it unadvisable to take the kayak, as they were to hunt seal in pools, it was not sent.

My journal * says: "Lieutenant Lockwood's party returned, at 4.30 P.M., very much worn out, having been obliged to drop the sledge and load two miles from camp. The ration on which this hard work and severe exposure is done consists of a pound of meat, eight ounces of bread, and one and a half ounce of potatoes."

The condition of the party is shown by an extract from Lieutenant Lockwood's diary. He says: "We are now in our hut, but it is not yet finished, and is cold and uncomfortable. Our constant talk is about something to eat, and the different dishes we have enjoyed, or hope to enjoy on getting back to civilization. How often my thoughts turn toward home and the dear ones there. We all suppose that Garlington and party are at Littleton Island; but yet doubts will arise as to it. We have found out some scraps of news from slips of newspaper wrapped around the lemons. Each man had a lemon to-night. We are all hungry all the time. Blubber-lamp burning to-night for the first time. Lieutenant Greely, Israel, Biederbick, Whisler, Bender, and Gardiner are on the invalid list to-day, with sore feet, cramps, and minor ailments. By 3 P.M. it was very gloomy."

I continue from my own journal:

"October 22d.—I sent Rice and three others to Cape Sabine,

* All quotations not otherwise credited are from my own journal.

with orders to bring up as much of the clothing as possible by packs. It is impossible as yet to send a sledge to Sabine, owing to young ice not having yet formed along the shore at points where the current is strong. The exceedingly rugged and broken character of the coast forbids any possibility of reaching the cape by land. Gardiner, Biederbick, and myself were the only ones who remained in camp. We devoted our time, as far as was possible, to bringing sand and building the outer snow wall. Lieutenant Lockwood, with thirteen of the party, brought in the loaded sledge left yesterday, being absent nearly four hours.

“Ellis’ birthday has been celebrated by a punch, which consisted of a half gill of rum—regularly issued of late—flavored with a couple of lemons, and a can of cloudberries. This indulgence, though a small one, greatly benefits the men, improving their spirits. Rice’s party on their return brought, among other things, a newspaper article written by Henry Clay, May 13, 1883. The reference to De Long shows the loss of the Jeannette and his party.”

Of this Lieutenant Lockwood writes: “We infer the loss of the Jeannette, and the alarming view which must be taken at home of our situation. We all think that our friends regard us as lost. Rice read the paper aloud this evening, and it has excited a great deal of remark. We all think Clay’s paper is almost prophetic, except, of course, our lying down under the quiet stars to die. The article gives me pain in the reflection of the great alarm and sorrow felt by my dear father and mother and sisters in my behalf. Should my ambitious hopes be disappointed, and these lines only meet the eye of those so dear, may they not add to my many faults and failings that of ingratitude, or want of affection, in not making more frequent allusions to them and my thoughts concerning them.”

The spirit of Lieutenant Lockwood's notes was the same as that which prevailed generally in the party during the entire winter. It was frequently said that those who were near and dear to us at home were more to be pitied than ourselves. We were facing a stern and frightful reality, but they could not fail to be mentally tortured by doubts and fears of every kind.

"October 23d.—Cloudy, with chilling northwest wind and a temperature of -6° (-21.1° C.). As Sergeant Rice reported that ice was forming yesterday along the shore, so that possibly the party might reach Sabine with a sledge, I called the cooks at 4 A.M., and sent Lieutenant Lockwood with eleven others to bring as much of the English cache as possible. In order to insure the safety of the records of the expedition, I sent them and the pendulum, with orders to cache them in a prominent cairn on the south side of Payer Harbor. I know that point will certainly be visited, and that possibly our present camp might be missed by a relief expedition, and all the records lost if left here. I am determined that our work shall not perish with us. Lieutenant Lockwood was directed to leave with the records a notice similar to the one sent by me a few days since to the cairn on Brevoort Island. I ordered that the cache at Payer Harbor be taken up prior to the clothing and tea at Sabine. The days are shortening now so rapidly that it is with difficulty the party can travel from here to Payer Harbor and return, so the cache there must be taken up first. The party was unable, owing to the sledge breaking, to bring in a load to-day farther than Sabine, whence they returned without sledge, having been absent over ten hours. Lieutenant Lockwood and Dr. Pavy each injured a foot while pulling through some pointed rubble ice. Open water and one or two seals were seen in Payer Harbor. Lieutenant Lockwood reports that he has made a very prominent cache, with the pendulum rising from its top, so that no

one visiting Payer Harbor can miss seeing it. It is on Stalknecht Island. The record was left in the sextant box."

"October 24th.—Sent a party to Sabine, which brought in the load by half past five, after ten hours' work. Elison temporarily repaired the sledge at Cape Sabine this morning, and will put it in good order to-morrow. I have told him that the sledge must not only do our autumn work, but must be so strength-



Our Records and Instruments.

[Cached October, 1883, on Stalknecht Island.]

ened that we can cross to Littleton Island in March, and he has promised that it shall be. Lieutenant Lockwood told me that he had not the heart to refuse the men permission to eat some mouldy bread at Cape Sabine, and I in turn had not the heart to reproach him farther than to say such permission must not be repeated." His journal says: "Allowed the men to eat the mouldy bread out of one of the bags; we ate ravenously."

"October 25th.—The sledge broke again yesterday, and was

temporarily patched up, but it was found to be in such bad order that it must be carefully repaired before being fit for further use. Considerable work was done toward the completion of our quarters, by laying blocks of snow upon the roof. Long returned this evening with the two Eskimos. He reports that Christiansen shot a seal, which would weigh about seventy-five pounds dressed. Though half a dozen seals have been seen, only this one has been obtained. Long says that their sufferings have been intense these past few days—ill fed, and without fire or even proper bedding; but he is strong in his determination to remain out while a glimmer of light remains. The sun leaves us to-morrow, but has not been seen by us for the past twelve days.

“As no sledging could be done, I directed Brainard to open the dog-biscuits and ascertain their condition, which was evidently bad.” His journal says: “When this bread, thoroughly rotten and covered with a green mould, was thrown on the ground, the half-famished men sprang to it as wild animals would. What, I wonder, will be our condition, when we undergo a still greater reduction in our provisions?”

I recall most vividly my efforts to persuade the men to let alone that mass of corruption, pointing out that the injury from eating such food must be far more certain than any possible benefit could be. In accordance with my instructions the slimy, mouldy substance was thrown away, but I learned later that a few ate all of it.

“October 26th.—Our last day of sunlight for a hundred and ten long days, and how to pass this coming Arctic night is a question I cannot answer. Last evening we had a reading by Rice from the scraps of paper, which I had carefully unwrapped from each lemon and dried out in my sleeping-bag. We have learned, some days since, that Garfield is dead, and that the

Cabinet, except Lincoln, has been entirely changed ; we consider Lincoln's retention hopeful for us. The wretched Eskimo lamp, with its faint glimmer of light, is held close to the reader. Some already begrudge the oil for this purpose, but I look on it as more than well spent in giving food for our minds, which, turned inward, these coming months would inevitably drive us all insane. Biederbick, our faithful steward and cook, when called, at 4 A.M., reported an aurora, which probably is a continuance of the brilliant streamers and arch seen by Brainard last night.

"I sent a sledge party to Sabine for a load, which returned about 2 P.M., reporting that the sledge had again broken down two miles from our hut. The hunters kept out to-day, although the temperature was -7° (-21.7° C.), but saw no game. During the evening I announced to the party what my intended programme was, and invited the opinion of the men concerning it, and also asked for suggestions. I said that the present ration would be continued until November 1st, after which it would be reduced to about six ounces of bread, four ounces of meat, and four ounces of vegetables, etc.; aggregating in all about fourteen ounces. By this means the party could be provided for until March 1st, at which date there would be remaining ten days' rations, on the scale of ten ounces of bread, ten ounces of pemmican, and a small quantity of tea daily, on which to cross Smith Sound by sledge. There was a warm and animated discussion regarding the reduction."

I quote what Lieutenant Lockwood says on the subject: "The doctor urged that a great objection to the reduction of the ration was that our strength might be reduced, that disease, scurvy, etc., would be brought on, and only too late we would find it impossible to recover. I remarked that the general view taken by the party, as far as I could get it, was that our

rations should be reduced to the very lowest limit, and afterward increased enough, if necessary, rather than the contrary. So it seems to be fixed upon that we are to try to make out on our food until March 1st. Then we shall try to cross the straits on ten ounces of pemmican, ten ounces of bread, and tea included."

"October 27th.—Sent a party out for the sledge and load which was left yesterday. Elison and Schneider went in advance of the party in order to repair the sledge. The balance of the party have been engaged in working on the snow wall around the house. Another of the barrels of dog-biscuits, which originally contained one hundred and ten pounds, was examined to-day, and found to be in very bad condition. Fifty-eight pounds only were fit for eating, and all of that was more or less mouldy. The remainder of the biscuits was a mass of filthy green mould, which the doctor declared would be injurious to the party. In consequence I ordered it thrown away, but a number of the party ate of the green, mouldy mass until I forbade it."

I learned later, that every particle of it was eaten, as that discarded before had been, by some of the party, whose ravenous sense of hunger was too strong to enable them to follow the dictates of their better judgment.

Lieutenant Lockwood, on that date, said: "To-night we have mutton and two cans of salmon for supper—about a third of what would be necessary to satisfy the appetite. This constant hunger is a miserable feeling, and goes not a little way to make our circumstances more dismal. Still the party all remain in good spirits. I dread next month, however, when we commence a still further reduction. How often my thoughts wander homeward to the dear ones there! I went along to-day to help to drag back the sledge, my knee being better."

“October 28th.—The temperature fell to -17.5° (-27.5° C.) last night. The sledge party sent to Sabine, with orders to break up the whaleboat and bring her in for fuel, were gone nearly eight hours. The sledge broke down three miles from camp, and the party came in without the load. The day was a very bad one, and a cold, strong, northerly wind, with heavy snow and the darkness, made travelling very difficult and fatiguing. Fortunately, the only thing now to be hauled in is a portion of the whaleboat still at Sabine. The difficulty of travelling over the rough, hummocky ice at present is hardly to be understood by any one who has not experienced work of this kind. The sun left us a few days since, which necessarily adds to our discomfort and depression. The hunters are out daily for game, but have found none, and to-day the violent storm drove them all in.”

Lieutenant Lockwood says: “This is miserable; we have insufficient supplies of everything. Even the blubber will support but one poor light, and that hardly for the winter. We must rely on the whaleboat and the barrel-staves mostly for fuel, the alcohol being almost exhausted. Cold, dampness, darkness, and hunger are our portion every day and all day. Here in the hut one has to grope around in the darkness to find anything laid down.”

“October 29th.—Elison fixed the sledge in the morning. The interior of the house has been graded with gravel and sand, so that most of the rocks under us are covered, and the sleeping arrangements have finally been completed. Two mattresses have been found, which will add somewhat to our comfort. By unanimous consent one mattress was set aside for me, and I directed that the other be disposed of by lot. It fell to Lieutenant Lockwood and Dr. Pavy, who have taken it. I turned over my mattress to Sergeant Gardiner, who for the past month has

occupied my dog-skin sleeping-bag, until his condition improves. The blankets, buffalo coats, etc., have been nearly equitably distributed, the sick receiving rather more than others. The hunters were out to-day, but obtained nothing, and Long was unfortunate enough to break through the young ice, and returned completely wet. Henry reports his foot frosted yesterday, but the doctor says the injury is slight."

An extract from Lieutenant Lockwood's diary shows the effect which hunger had already produced upon the party. It should be borne in mind that this experience occurred before the reduction of food to our regular winter ration. He says: "Occupied some time this morning in scraping, like a dog, in the place where the moulded dog-biscuits were emptied. Found a few crumbs of small pieces, and ate mould and all. We now get about one-fourth what we could eat at a meal, and this little ration is to be much farther reduced as soon as the sledging is done."

"October 30th.—Sent twelve men for the whaleboat, who were gone nearly seven hours, and issued to them two ounces of extra pemmican; as well as to Elison, who is working on a Hudson Bay sledge for the trip to Isabella. The sledge party had a hard trip, owing to the rough ice, the high tide, darkness, and a strong westerly wind. Rum was issued for the last time daily; hereafter it is to be issued regularly on Sundays and to working parties. I sent Long and the Eskimos to Rice Strait for a few days' hunting, giving them, as a daily ration, eight ounces each of meat and bread, one-fourth gill of rum, one ounce of potatoes, and four ounces of alcohol for fuel—an inadequate amount of food for men undergoing such great hardships, but I can grant no more. Bender was fortunate enough to kill a blue fox with his fist; it was caught with its head in a meat-can. Schneider and Connell unwell, Henry and my-

self suffering from frozen feet, and Gardiner from a felon on his hand. Israel is suffering excessively from our unaccustomed privations, but he refrains from any utterances in the nature of complaints."

"October 31st.—A fox around camp this morning, but it was too dark to shoot him. Sent a sledge party, in a temperature of 2° (-16.7° C.), for the load which was abandoned three miles from the hut a couple of days since. They were gone about five hours. Dr. Pavy to-day objected strongly to the ration fixed by me which commences to-morrow. He says that we cannot possibly live on it. It is very trying to have the opinion of my medical officer put so strongly before me at a time when I must depend upon my own judgment alone, as the responsibility rests solely upon me. Most of the party concurred either in my views or in their willingness to be satisfied with my decision in the matter. While this should ordinarily be expected from a party under military discipline, yet, under the present circumstances, where moral influences alone have sway, and where so great hardships and privations have already been experienced, I cannot but be gratified by this general expression of confidence in my judgment and discretion."

Lieutenant Lockwood says: "To-morrow our reduction of ration commences. Whether we can live on such a dribble of food remains to be seen. We are now constantly hungry, and the constant talk is of dishes of all kinds, and what we have eaten and what we hope to eat when we reach civilization. I have a constant longing for food; anything to fill me up. God, what a life! A few crumbs of hard bread taste delicious. One imagines one thing, and another another. I spend much time in thinking of bills of fare. The hunting party have a slight increase of ration during their absence. I hope to God they have got something. How often my thoughts wander home!

I recall my dear father and mother, and the family generally. Then come the familiar family dishes of all kinds. Numbed fingers and want of light; I can write no more. No more sledging, excepting Rice's trip, until the spring, should we live to see it."

Our rations were now collected, and it remained to be seen if we could supplement them by our own exertions sufficiently to eke out an existence until spring and help should come. I had, however, decided on the necessity of a journey to obtain from Cape Isabella, forty miles to the southward, the one hundred and forty-four pounds of beef cached there by Nares in 1875. It would give nearly an ounce of meat to each daily, which, in the coming winter, might mean life or death.

This was the only cache on the entire western coast not already taken up by us, with the exception of the small cache of one hundred and twenty two pounds hard bread, left at Cape Cracroft, near Fort Conger, when we had all the provisions we could carry.

CHAPTER XXXVII.

THE TRIP TO ISABELLA.

THE account of the journey to Cape Isabella, to obtain one hundred and forty-four pounds of English meat, is drawn largely from the relations of Frederick, a participant, and of Brainard, the advance guard of the rescuers.

The party, consisting of Rice, Frederick, Elison, and Lynn, left in a temperature of -9° (-22.8° C.) on November 2d, with a light sledge, a four-man sleeping-bag, a tent fly, rifle, cooking-lamp, and pot. They had a ration of eight ounces each of bread and meat, and five ounces of fuel alcohol. Rice was selected for the command, from his familiarity with the route to be travelled over. As the Arctic night had commenced a week before, darkness drove them to their bags on the ice, in Rice Strait, the first day out; but on the second they reached, tired and hungry, Eskimo Point, where they camped in our old quarters. The third day rough ice impeded their progress, and exhausted Lynn and Elison so that they camped before Cape Isabella was reached. On this day Elison and Lynn, in their great thirst, resorted, despite warnings, to eating snow, which proved so fatal to the former.

On November 7th, taking only their sledge, they found the ice so bad that they were seven hours in reaching Isabella and ascending to its summit. "The sky was clear, the moon bright, and to the southward," says Frederick; "we saw open water as far as the eye could reach. Waves, with white caps, came roll-

ing in to the very cape itself. Even at this season a vessel could have navigated without difficulty. Could we have embarked at this point, I have no doubt but we all would have reached our homes in safety.”

They took up the cache of meat and started immediately on their return, but the rough ice-foot on the north of Isabella, in Baird Inlet, was so difficult to travel over that it was fourteen hours before the exhausted party reached their sleeping-bags. Rice had expected to make the trip in a few hours, and the day's work had been done on a cup of tea and no food. On reaching their camp, Frederick says, “Elison had frozen both his hands and feet, and our sleeping-bag was no more nor less than a sheet of ice. I placed one of Elison's hands between my thighs and Rice took the other, and in this way we drew the frost from his poor frozen limbs. The poor fellow cried all night from pain. This was one of the worst nights I ever spent in the Arctic.”

Warm food refreshed them somewhat the morning of the 8th, but Elison again frosted his sensitive limbs, and Frederick continues: “It became unsafe to let him travel behind the sledge alone, and I took the poor fellow on my arm, and had almost to carry him, for his legs became as stiff as cord-wood, and he was unable to handle them. This is the closest I have ever been hitched in my life. If there is anything that will try the mettle of men, it is to put them in deep, soft snow and hummocky ice, with a ‘rue-raddie’ over their shoulders; but, nevertheless, we stood it like men, and I never heard a murmur of discontent.” *

Elison was altogether helpless on the morning of the 9th, and

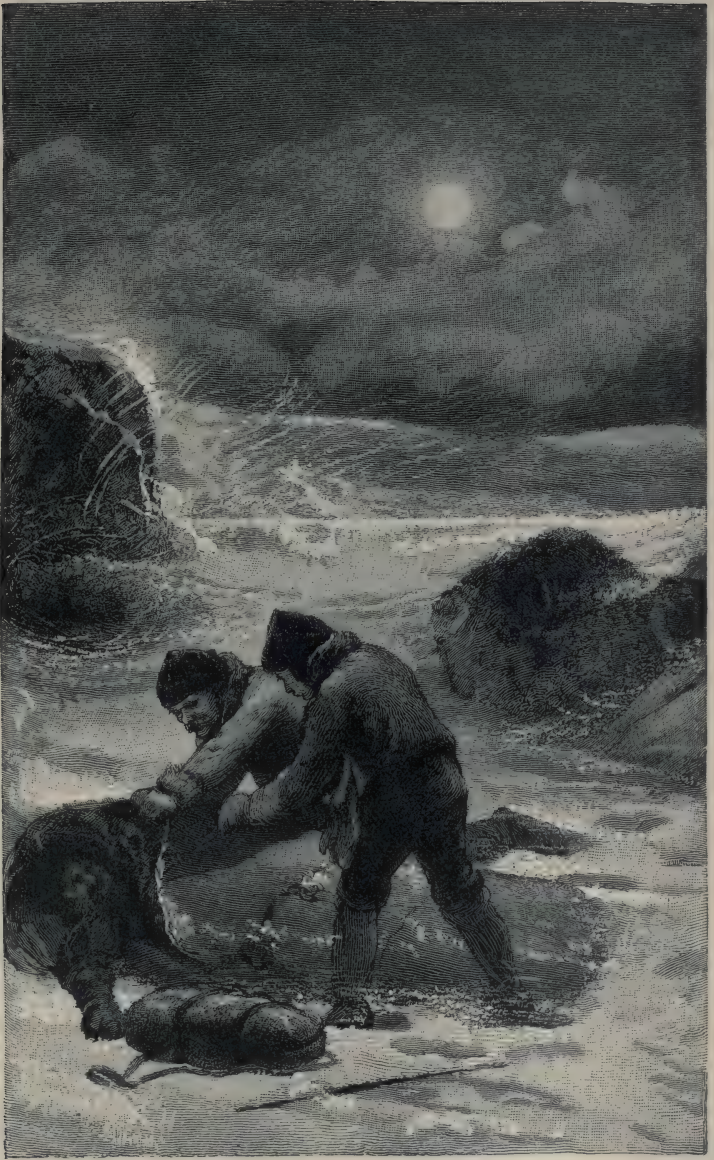
* It is worthy of remark that, though these men were doing their work on only sixteen ounces of food, and the temperature was from -20° to -25° (-29° to -32° C.), Frederick makes no special mention of their sufferings from cold and hunger. Such was the stamp of this man.

so, to save his life, it became necessary not only to abandon the meat, for which they had labored and suffered, but also a rifle, which was stood up to mark the spot. Ten hours' struggle, with a helpless, frozen man, brought them to our abandoned winter quarters at Eskimo Point.

To thaw out Elison's limbs, and dry his clothing, "which was a perfect sheet of ice," they were obliged to cut up the English ice-boat that had been left intact for a possible journey southward. "When the poor fellow's face, feet, and hands commenced to thaw from the artificial heat," says Frederick, "his sufferings were such that it was enough to bring the strongest to tears." Rice and Frederick on this day labored nineteen hours for the welfare of their comrades.

On November 10th they started for Camp Clay, Lynn going ahead with Elison, while the others dragged the sledge. The low temperature, about -25° (-32° C.), soon froze Elison's limbs and face, and glued together his eyelids. Frederick says: "We tried to keep Elison in front of us, but to no avail. He would stagger off to one side, and it seemed every moment that the frost was striking deeper into the poor man's flesh. We fastened a rope to his arm and the sledge, as it now took three men to haul our load, but every few rods the poor fellow would fall, and then sometimes he was dragged several feet. No person can imagine how that poor man suffered."

They finally reached the hill or divide between Baird Inlet and Rosse Bay, but were unable to haul Elison up the hill, and his feet were frozen so solidly that he could not stand. In consequence they were obliged to camp. A northward gale, with a temperature of -22° (-30° C.), prevailed, so that Rice and Frederick froze their fingers in an unsuccessful attempt to kindle a fire, while the sleeping-bag was laid in the only possible place, exposed to the full fury of the gale. They decided that Rice



BRAINARD AND CHRISTIANSEN SUCCORING ELISON, LYNN, AND FREDERICK.

should start for Camp Clay to obtain assistance, and he at once left, eating some frozen beef on the way. How he made the fifteen long miles he hardly knew, but through Rice Strait he travelled in the darkness, across ice newly formed, which cracked and bent as he passed. As he reached Buchanan Strait the moon fortunately shone forth, and, a broken, exhausted man, his staggering footsteps awakened me at midnight, and inspired me with new horror before his frozen lips could separate to say, "Elison is dying in Rosse Bay!" in answer to my anxious "Who's there?" He had travelled twenty-five miles and labored sixteen hours to bring us this dreadful intelligence.

In gloom and depression we heard the story, and counselled as to the rescue. I sent Brainard and Christiansen, at 4.30 A.M., in a temperature of -28° (-33.3° C.), with brandy and food, to relieve the immediate necessity of the party, and two hours later Lieutenant Lockwood, Dr. Pavy, and the four strongest men (Jewell, Ellis, Schneider, and Jens) followed, with our large sledge.

Of the night passed by the men, Frederick says: "We tried to keep him (Elison) warm, but as we laid helpless and shivering with the cold, and poor Elison groaning with hunger (his frozen lips did not permit him to gnaw the frozen meat) and pain, you can imagine how we felt. Lynn was a strong, able-bodied man, but the mental strain caused by Elison's sufferings made him weak and helpless. In fact, I was afraid that his mind would be impaired at one time. We were but a few hours in the bag when it became frozen so hard that we could not turn over, and we had to lay in one position eighteen hours; until, to our great relief, we heard Brainard's cheering voice at our side. There was nothing more welcome than the presence of that noble man, who had come in advance with brandy for Elison and food for all."

A few hours later Lieutenant Lockwood came, and Frederick continues: "It was a godsend to be released from our prison. It was impossible for them to get us out of the bag the same way we got in, so it became necessary to cut the top of the bag off to relieve us. We were unable to stand alone, and our clothing was as stiff as boards."



Sergeant Joseph Ellison.

Frederick and Lynn were sent in alone to Camp Clay, which they reached safely, although Frederick broke through the young ice at one place.

Lieutenant Lockwood arrived at 2 A.M., with Ellison alive, but in a very critical condition.

Not only were Ellison's hands and feet frozen solid, but his face was frozen to such an extent that there was but little semblance of humanity in the poor fellow, as he was dragged

through the narrow door of our wretched hut that November night. He begged piteously for death the first week, but within a month was a bright and cheery member of our party, despite his utter helplessness and great pain.

This journey of Lieutenant Lockwood and his party is, I think, the most remarkable in the annals of Arctic sledging. The half-starved, enfeebled party of eight men made a journey of nearly forty miles in forty-four hours. They travelled in darkness over very rough and heavy ice, exposed to temperatures ranging from -19° to -34.5° (-28.3° to -36.9° C.), and without mishap or disaster. They had been on reduced rations for over two months, and, although unfit for the most ordinary service, ventured their lives most cheerfully on the mere possibility of rescuing a comrade whom they expected to find dead. Except Brainard and Frederick, both rescuers and rescued perished piteously, notwithstanding the most determined struggle for existence. Certainly the men of the Lady Franklin Bay Expedition merited, by their courage, endurance, and helpfulness, a better fate.

The open water extending southward from Cape Isabella raised at once the question as to what would be done for our relief, and much discussion ensued among us.

It is perhaps best here to break that silence maintained by me for the many months since my return, through the long and bitter discussions regarding the responsibility for our great disaster, but I intend to weary no one with a lengthy and uninteresting argument.

There exists no doubt that in 1881 I should have done more than arrange for a retreat to Cape Sabine if we should not be reached at Conger. Although not under orders to do so, I should have provided against shipwreck and all other mischances. There is no doubt either, that General Hazen re-

grets that Memorandum No. 4 of his orders was not allowed to stand, as being in the direction of greater safety for all.

The neglect of these points would have been uncriticised, had the Proteus disaster not occurred. As to the responsibility for that disaster, others are better qualified than I to speak.

Similarly, the neglect of Lieutenant Garlington to replenish the stores he knew to be damaged, although he was under orders to do so, would have been unnoticed. I am already on record as pointing out the disastrous effect of such disobedience.

His action in taking every ounce of food he could carry when turning southward cannot be justified, nor his retaining and feeding a large dog under such circumstances. He acknowledged the dangerous condition in which we were situated, promised all assistance in the power of man, tied us down to Sabine, and, as events have proved, never even asked a national ship to turn its prow northward to our rescue or relief. Within thirty miles of twenty days' rations for his party, and a hundred miles from six months' supplies, which it was obvious could not be reached by me later in the season, he loaded his boats to the danger-line, even carrying food in tow, to insure the safety of his men. Others may justify this extreme prudence for his own party, but I can hardly be expected to.

The action of Commander Wildes in separating from the vessel he was to aid in this very emergency, his long delay at the Greenland ports, and his precipitate retreat southward from Smith Sound, have never been satisfactorily explained to his department. He knew that twenty-five of his countrymen counted on aid and relief that year, but his orders did not require him to assist them; so no misgivings as to their fate disturbed him, and his ship went southward still freighted with abundant and undiminished stores.

The Proteus disaster, and the subsequent failure of Com-

mander Wildes to extend relief, did not alone determine the fate of the party. I have already officially concurred in the views of Chief Engineer Melville, and the opinions of the sealers of Newfoundland, that our relief was practicable during the autumn of 1883. I can understand the unwillingness of the Secretaries of War and of the Navy to send again northward the officers who had just failed us in Smith Sound, but not even this reason seems sufficiently urgent to justify the final adverse decision. I doubt not that the late Secretary of the Navy coincides in my opinion on this subject. The attempt of ex-Secretary Lincoln to defend his joint action in this matter must fall to the ground before the stern array of facts in the case. Had a stout sealer—and there were many available—left St. John, under a competent officer, within ten days after the return of the *Yantic*, the entire Lady Franklin Bay Expedition, in my opinion, would have safely returned.

In 1852 the tiny *Isabel* remained within the Arctic Circle, searching for Sir John Franklin, until October 4th; and for the relief of the *Polaris* party the steamer *Tigress* sailed a second time, under an officer of the navy, from the port of St. John, on September 17, 1872, five days later in the year than the return of the *Yantic*. All Arctic work is dangerous; and it was a question of risking much and spending little to bring the party back safely that autumn, or venturing less and spending lavishly to return the dead the following year. Prudent counsels prevailed, however; and, as the public said, the party was left to its fate.

CHAPTER XXXVIII.

WINTER QUARTERS.

THE first days of November gave us a realizing sense of the horrors and miseries to be expected from a sunless winter of nearly four months' duration under existing conditions. Nearly half of the party were unfit for duty, by reason of frost-bite or injuries received during our arduous autumn work. Our sleeping-bags and clothing were already frozen to the ground, and their interiors were thawed only by the heat of our bodies, and froze solidly on quitting them. The roofs and walls speedily gathered frost and ice, as did every other article in our wretched hut. It appears better to me that the story of our life that terrible winter should be set forth in the language of our journals, and should not be elaborated now in the comforts of civilization. While cleaving to stern facts, I have occasionally modified the sharpness of my comments. The reader is asked to bear in mind that the entries quoted were written by men patient in hardships, and always inclined to underrate, as a matter of pride, their great discomforts.

“November 1st.—We have on hand at this date the following stores: Lemons, 150; pemmican, 228 lbs.; bacon, 232 lbs.; beef, 410 lbs.; seal, 115 lbs.; potatoes, 76 lbs.; butter, 98 lbs.; lard, 50 lbs.; rice, 18 lbs.; raisins, 40 lbs.; tea, 73 lbs.; extract of coffee, 82 lbs.; extract of chocolate, 76 lbs.; onion-pickles, 10 gals.; milk, 38 lbs.; sugar, 15 lbs.; salt, 2 lbs.; onion-powder, 2 lbs.; pepper, 12 ozs.; bread, 1,395 lbs.;

dog-biscuit, 152 lbs. ; extract of beef, 34 cans ; soup, 48 cans ; tomatoes, 24 cans ; corn, 24 cans ; peas, 27 cans ; carrots, 13 cans ; cloudberry, 46 cans ; seal-blubber, 200 lbs.*

“The quantity of bread is uncertain, being partly estimated. The dog-biscuits, English bread, English chocolate, and some other small stores are in bad condition, but must of necessity be eaten. We commenced to-day on a ration declared by the doctor to be insufficient for the support of life, but which has been adopted by me, after mature deliberation, as being our only chance of safety.

“It is as follows : Meat, 4 ozs. ; extract of beef, 0.26 oz. ; evaporated potatoes, 0.4 oz. ; soup, 0.6 oz. ; tomatoes, 0.3 oz. ; peas, 0.2 oz. ; corn, 0.2 oz. ; carrots, 0.1 oz. ; bread, 6 ozs. ; dog-biscuits, 0.8 oz. ; butter, 0.5 oz. ; lard, 0.26 oz. ; rice, 0.1 oz. ; raisins, 0.16 oz. ; tea, 0.3 oz. ; extract of coffee, 0.44 oz. ; extract of chocolate, 0.3 oz. ; pickled onions, 0.4 oz. ; milk, 0.2 oz. ; and mulberries, 0.2 oz.

“Lieutenant Kislingbury is suffering very much, and fainted twice this evening, from his injury received while sledging, which the doctor reports to be rupture. Schneider killed a white fox weighing five and a quarter pounds, all of which, except the skin, is to be eaten. It is a great disappointment to find that the English potatoes cached in Payer Harbor are mouldy and almost uneatable.† They are packed, however, in paper, which accounts for the deterioration. Bender has made a stove from the sheet-iron with which the whaleboat was sheathed. It is a truncated cone in shape, and answers its pur-

* We later obtained 150 lbs. of seal-meat, 325 lbs. of bear, about 90 lbs. foxes, about 75 lbs. of dovekeys and ptarmigan, 1,155 lbs. shrimps, 83 lbs. seaweed, and considerable quantities of reindeer-moss, saxifrage, and lichens.

† The barrel of beef, *badly secured*, left by Lieutenant Garlington at Cape Sabine, was never seen by us, nor the bacon said to be left in the wreck cache.

pose admirably. The barrels in which the food was cached, a small quantity of birch-wood, and the broken-up whaleboat is the scanty fuel, which supplements the English stearine and our own alcohol. In order to insure perfect combustion, and to derive the greatest heat from the fuel, the wood is cut up into pieces not much longer than matches."

"November 2d.—The doctor informs me that Lieutenant Kislingbury's rupture, from which he has suffered very much, is very serious, and may prove fatal. Ralston killed a white fox weighing four and a half pounds, and Brainard shot a blue one weighing three pounds. Our first meal cooked with wood in stoves made by Bender was eaten to-night. The stoves work very well; and, in order to economize fuel, I determined that the cooking should be done hereafter on one stove. There was a great deal of adverse criticism in regard to this decision, as, the party being divided into two messes, it will be necessary for one mess to wait until the cooking for the other is done. This is certainly trying to hungry men, but fuel is very scarce, and must be utilized to the utmost extent. Brainard discovered that a quarter of the English tobacco from Payer Harbor cache is missing. We were unable to determine whether it was never packed, or if it has been taken by some one. The former I prefer believing at present."

"November 3d.—Long came from Rice Strait for further rations. He brought me the joyful news that he has killed an harbor-seal, which he thinks will weigh one hundred and fifty pounds gross. The foxes have been very troublesome at Rice Strait; no matter what precautions are taken, the foxes manage to make their way into the tent and levy contribution on the meat there. Lieutenant Kislingbury is fortunately better. Colorless auroral streamers were visible from 3 P.M. until after 7 P.M., the curtain formation showing at times, and the au-

roral light was seen in all quarters except the north. Sergeant Israel observed Vega to-night. The temperature sank to -13° (-25° C.). Fresh bear-tracks were seen by Long near Cocked Hat Island, the animal coming from and returning toward Bache Island. The hunters have hopes of Master Bruin some day. The men are hopeful and cheerful, bearing well the cold, and short rations, and entire absence of light in the hut, except such as is afforded by the bit of rag dipped in seal-oil."

"November 4th.—Long left this morning, taking provisions to include Thursday. Brainard reports that the temporary commissary storehouse was entered last night. He suspects one of the party, who has been known to eat hard bread in his sleeping-bag. I am pushing work on the storehouse to avoid such dangers in the future. I decided to dispose of the foxes that we may kill as follows: They are to be issued as extra meat; the first fox being for the present week, the second fox for the last week in February, the third for next week, the fourth for the third week in February, etc. Under this rule, we ate to-day the fox killed by Bender, weighing three and three-fourths pounds. It is the first fox ever tasted by me, or, indeed, by any of the men, except, perhaps, the Eskimos. We pronounced it extraordinarily good, seasoned as it is with ravenous hunger. We are troubled much by smoke from the stoves. Issued a pound of blubber extra to-day for food, and another pound for light. Reading in the evening as usual, including the Psalms for to-day. The temperature down to -25.7° (-32.1° C.); terribly cold for our hunters and the unprotected travellers in Baird Inlet. With the rum, this evening, I issued a quarter of a lemon, which we unanimously declared to be the most delicious fruit ever tasted."

"November 5th.—Commissary-house finished, but not covered. A chimney was inserted in the bottom of the boat,

which forms part of the roof of our house. It was made from several tomato-cans, and affords great relief from the intolerable smoke. The doctor reports that Henry's foot was frozen more badly than he had thought. I have ordered that the mouldy bread, rotten biscuit, and other damaged stores be issued now, while our systems will best assimilate them, so that the best and strongest food shall come later, and so be an increase in nutrition though not in quantity."

"November 6th.—The stores were moved into the commissary-house to-day, and I feel somewhat relieved, although I cannot consider them safe until a frame and door, with lock and key, which we fortunately have, are arranged. Brainard overhauled the English sugar and tea; of the former but a few pounds remain, and the latter is quite worthless. If those articles only had been replaced, what comfort to us!"

"November 7th.—Strong westerly wind in the morning, with the temperature down to -20.3° (-29.1° C.). It sent down the temperature of our hut very much, and must be almost unendurable for the Isabella party. I cannot sleep much for thinking of them. Christiansen came in from Rice Strait, and reports that Long wants a sledge to-morrow to bring in his meat and camp equipage. Unfortunately they have not been able to kill anything since last week. Brainard's report that the seal-blubber overruns some ninety pounds, by his improvised scales, encourages the party greatly. I am doubtful as to the accuracy of the scales, but maintain silence, knowing Brainard's integrity and impartiality; and realizing, too, the importance of adding or seeming to add a half ounce of blubber to our ration."

"November 8th.—The temperature still falling, being at -31.5° (-35.3° C.) this morning. It was necessary, however, to send Lieutenant Lockwood, Dr. Pavy, Brainard, and five others to Rice Strait to bring in Long's equipage and meat. On their

return I issued an allowance of rum to them. Private Schneider, owing to Brainard's exhausted condition, being charged with portioning out the rum, took for himself a quantity without authority, and was visibly affected by it. He left the hut while the supper was cooking—he being the cook—and, not returning at once, search was made for him, and he was detected coming out of the commissary storehouse. The general sentiment is that Schneider has been implicated in the thefts which have been made therefrom. I am in doubt as to whether he entered the storehouse in a responsible condition mentally, but his taking the liquor is as bad as the food. I issued an order forbidding any one from entering the storehouse except the issuing sergeant, and took Schneider to task most severely for his misconduct."

"November 9th.—Lieutenant Lockwood discovered an opened but full can of milk hidden away. It had evidently been concealed by some one, who, surprised, had been unable to eat it after opening."

It appeared from the marks that the can was opened by a knife broken in a peculiar manner. It was afterward ascertained that the knife belonged to Henry, but he claimed to have lent it to Schneider.

"November 13th.*—The minimum temperature last night was -34° (-36.7° C.). Elison's condition is much better than could have been reasonably hoped for. Dr. Pavy thinks it barely possible that amputation may not be necessary. Biederbick shot a white fox to-day, which weighed five and a half pounds. Biederbick is devoting himself particularly to the care of Elison. He spends sixteen hours daily watching him and changing his bandages. Dr. Pavy, who has moved to the

* As the dates from the 9th to the 13th are included in the previous chapter, they do not occur here.

side of Elison to facilitate his attention, cares for the sick man the remainder of the day. I have given him (Elison) my mattress, which has been used to this time by Gardiner."

"November 14th.—Elison very bad all day; he suffers excruciating pain in his hands and feet. The men are slowly recovering from their exhaustion on the late severe trip."

"November 16th.—Strong wind last night; tide to-day the highest yet known; high water at 12.05 P.M. (Washington mean time)."

"November 17th.—The canvas roof was put on the vestibule to-day, which substantially finishes out-door work. I have been able to do but little of this. The men have shown an excellent spirit in this respect. Some of them have requested that I should do no work at all, thinking that my mental responsibility, as commander, is enough for me at this time. I, however, have done, as far as my physical condition would permit, the same manual labor as the others. My feet, which have been badly cracked from frost-bite, have prevented me from exposing myself without there should be some pressing demand.

"I have been casting about for some means to amuse and divert the party during the weary time now upon us. The entire work of the party does not require more than an hour's labor from two or three, and the remainder, by choice or necessity, remain almost continually in the sleeping-bags. As we have fairly entered upon an Arctic night of nearly four months' duration, it is an absolute necessity that the spirits of the men should not be allowed to flag.

"After much thought and some consultation, I have decided to give, daily, a lecture, of from one to two hours in length, upon the physical geography and the resources of the United States in general; followed later by similar talks on each State

and Territory in particular. I commence to-day by talking on the physical geography of the United States, particularly with reference to its mountain and river systems. Lieutenant Kislisbury is much better of his rupture. He has suffered a great deal of pain from it, and once fainted under the doctor's hands."

"November 18th.—I talked for an hour or more to-day, regarding the peculiarities of climate and the various products, etc., of the United States. In the evening I read the Psalms for the day. Rum was issued, except to those who drew in advance on their return from their last trip to Long Point. There was some dissatisfaction among those who had drawn in advance, and I mentally resolved I would not permit advance rations to be again issued, except in extreme cases. I received no rum, having given my allowance, a couple of days since, to the nurses on watch over Elison. Brainard to-day put up a signal pole on the adjoining cliffs, which should be seen by any party travelling along the coast. I have not the faintest expectation of such a party this winter, but some of the rest have, and I am unwilling to depress their spirits by destroying any hopes they may nourish."

"November 19th.—Long shot a blue fox weighing four and a quarter pounds; Jens shot one weighing three and seven-eighths, which has much encouraged us. The entrails of the foxes killed go alternately to the messes, being used as an addition to, or flavor for, the stew. Talked for an hour or two on the grain and fruit products of the United States. Last evening there was reading from 'Pickwick,' by Jewell; 'Two on a Tower,' by Rice; 'A History of Our Own Times,' first by Lieutenant Lockwood, and later by Henry."*

* These books, with the exception of Two on a Tower, which was found in the wreck cache, were taken from Conger.

“November 20th.—I have been obliged to order reduction of meat and bread a fraction of an ounce, so that hereafter we have four ounces of meat daily and six ounces of bread. This reduction has been made necessary to provide extra rations for Elison. The doctor urged a very large increase, but I finally compromised the matter by giving him four ounces extra of bread and four ounces of meat. It seems to me that this, together with the extract of beef in the medical department, should be sufficient. The reduction was, of course, made on my own responsibility, but it was exceedingly gratifying to note that no one in the party in any way expressed his dissent from or dissatisfaction with my action. I believe the feeling to be general that the party realize that Elison's helpless condition has arisen from a spirit of self-sacrifice on his part in our behalf, and that in consequence we should be willing to deny ourselves, each a little, in his interest.”

“November 21st.—Elison has improved a great deal, and the doctor thinks that he will recover without an operation. On the doctor's representations, I have set aside all the lard (fifty pounds) for medical purposes. I hardly think it can all be necessary for Elison's wounds, but I am glad to indorse anything which seems to show forethought for the future. The reduction of lard and meat will be in a slight degree replaced by an inconsiderable amount of seal-blubber, which can be spared from our stock of oil. I gave an hour to the mineral productions of the United States. It was interesting to note the lack of interest shown by the party regarding the production of gold and silver. Several have spoken on the subject of money, and there are but few men who would not willingly sacrifice their entire pecuniary fortunes, if by so doing they could guarantee the successful return of the expedition to the United States.”

“November 22d.—Long shot a blue fox weighing three and one-half pounds, and later Christiansen shot another, also blue, which weighed the same as Long’s. I gave another hour to the United States in general; treating particularly of its geographical subdivisions, as I intend commencing on the States in detail to-morrow.”

“November 23d.—Talked for nearly two hours to-day on the State of Maine, touching on its climate, its vegetable and mineral products, its river system, mountain ranges, principal cities, its most important resources and manufactures, its history, and the famous men who have come from the State; and also as to its inducements to emigrants to settle within its limits. The same line of discussion will be followed regarding the other States. Subsequently I called upon Jewell, who has lived in Maine, to supplement my statements by any additional information he might possess; and, later, invited questions from any of the party on mooted or neglected points.”

“November 24th.—Talked for a couple of hours on New Hampshire; my remarks being supplemented by Jewell by an account of life on Mount Washington, which he contrasted very favorably with our present deplorable condition. Instead of the customary reading from the Bible, Dickens, and the Army Regulations, this evening was given up to reminiscences pertaining to the past lives and domestic surroundings of the men.”

“November 25th.—Sunday celebrated as usual by a ‘sun-of-a-gun’ for breakfast. This dish consists of a mixture of hard bread, raisins, milk, and as much seal-blubber as can be properly spared for the purpose. Several of my mess united with me in contributing our lemon-peel, in order to give it a flavor, and with the hope that the entire party will do so hereafter. Christiansen shot a blue fox, which weighed four and one-

fourth ounces, and Long saw another, but too far distant to be fired at."

"November 26th.—The temperature was down almost to freezing mercury this morning, with a clear sky. Jens reports that there are dense water-clouds to the north, but that toward Greenland the sky is entirely clear. I infer from this that the straits are freezing over.

"Bender complained to-day of unfair treatment toward himself, as to the amount of bed-clothing assigned him; claiming that he did not receive his due proportion. Such an accusation is extremely annoying to the whole party, as everybody realizes the fact of Bender's having received a much larger share than he is entitled to. Every consideration has been shown him by me, owing to his delicate condition on leaving Conger. I sometime since stripped the blanket from my own bag, much to the annoyance of Sergeants Jewell and Israel, who are occupying it in common with me. The result of Bender's complaint was that part of a blanket was transferred to him by other parties, who needed it as much as he. In addition, he has been given, for his personal use, a buffalo overcoat found here at the wreck cache."

"November 27th.—The temperature was down to -43.5° (-41.9° C.) last night, and went down to nearly 20° (-6.7° C.) inside the hut. I talked for awhile on Vermont to-day."

"November 28th.—Strong wind and drifting snow, which makes our quarters much more uncomfortable than yesterday, although the outside temperature has risen to -11° (-23.9° C.). A fox was fired at, but unfortunately missed."

"November 29th.—The last Thursday in the month, and so set aside by me as a day of thanksgiving and praise, in order that we might act in accord with those we have left behind. The day has been looked forward to for weeks; and, with a view of properly celebrating it, six pounds of rice, five pounds

of raisins, two pounds each of extract of coffee and chocolate, and two pounds of milk were reserved from the general stock when an inventory was made. It seemed to me then that making this a great and happy day would so break in on our wretchedness and misery as to give us new courage and determination. I am convinced that the idea was a most wise one. To-day we have been *almost* happy, and had *almost* enough to eat.

"I doubt if any other men in the world have been more thankful for their health, strength, and comparative happiness than we. An extra half gill of rum and a few lemons, under skilful manipulation, gave us the most delicious punch we had ever tasted. Songs, stories and merriment in general kept us all amused and cheerful until midnight. It seemed to me that the Psalms of the day made a deeper impression than I have ever before noted."

"November 30th.—A stormy day, with the temperature at 3° (-16.1° C.); the first time it has been observed above zero (-17.8° C.) this month. The month ends comparatively well, with Elison in much better condition than any one had hoped for. The party in general are in good health, although a number suffer much from constipation."

"December 1st.—An easterly storm of great violence set in, and made us very uncomfortable by drifting snow entering through the roof, and lowering the temperature within the hut. The evening was given up to personal reminiscences; and, when those failed, to discussing future prospects, which were looked on hopefully by most."

"December 2d.—The storm, which was exceedingly violent, continued until noon. It required several hours' work on the part of three men to clear out the entrance to the house, which had been entirely filled with snow. We find that the storm

unroofed the passage-way, blew away some of our wood and also the minimum thermometer. The cooks prepared breakfast under great difficulties. There was about eight inches of snow in the passage-way and on the bottoms of the sleeping-bags, which had to be cleared out as well as possible before anything could be done. Afterward the heat from the cooking-lamps melted the snow remaining, and in consequence the cooks were wet through by moisture from above and below."

"December 3d.—As much as possible of the wood was gathered up and brought within the house or the passage-way. Gave a couple of hours to-day to the State of New York."

"December 4th.—During last night some one, without doubt, took bread from Corporal Elison's bread-can. I was awake, and plainly heard it done."

In this entry of the most unfortunate experience of the month the name of Dr. Pavy was omitted. I was shocked that the surgeon of the expedition should so fail in his duty to the men and his commanding officer, and this discovery gave me great anxiety. Realizing that an open charge would result in a denial and bitter discussion, I committed my knowledge of this fact only to Lieutenant Lockwood, as my successor in command, and to Sergeant Brainard, who doled out the provisions. The importance of the doctor's services to us at that time was manifest to the entire party; nearly every one but myself had been treated medically since reaching Sabine, and the demand for medical treatment was constantly increasing. Whether right or wrong, I felt the necessity of pursuing conciliatory methods entirely.

"December 5th.—Another violent easterly gale set in last night, which changed to the west this morning, filling with snow the passage-way and commissary storehouse. The frequency of these late storms is trying to us, not only from the

physical discomforts experienced, but because the straits must necessarily remain open during the prevalence of such high winds. Our reading in the evening, which is apart from my lectures upon the various States, generally consists of a chapter or two from the Bible, by Gardiner; the Army Regulations, by myself; and a chapter of 'Pickwick,' by Jewell."

"December 6th.—Long shot a blue fox; weight three pounds. Gave an hour or more to Pennsylvania to-day. Reports from parties who have been on the hill indicate that the straits are open at present."

"December 7th.—A new water-hole was dug in the lake with great difficulty, as there were no proper tools for the work and the ice is nearly four feet thick."

"December 8th.—Brainard happily shot two blue foxes which together weighed seven and three-fourths pounds. Gardiner relieved me by talking an hour or more regarding Philadelphia. In cleaning out the snow from the vestibule the can of alcohol was unfortunately struck, and a small quantity (perhaps a pint) was lost. The careless man was soundly berated by the community at large."

"December 9th.—Two blue foxes were shot to-day, weighing over five pounds; one by Long and one by Brainard. The large number of foxes killed lately encourages us to hope that the supply may continue. One of the foxes shot was but half blue; all others have been distinctly blue or white, the blue species being invariably the smaller. Rice gave a glowing account of a year spent in one of the tropical islands of the Gulf of Mexico. The contrast to our present situation was so great that it added to the force of his graphic descriptions."

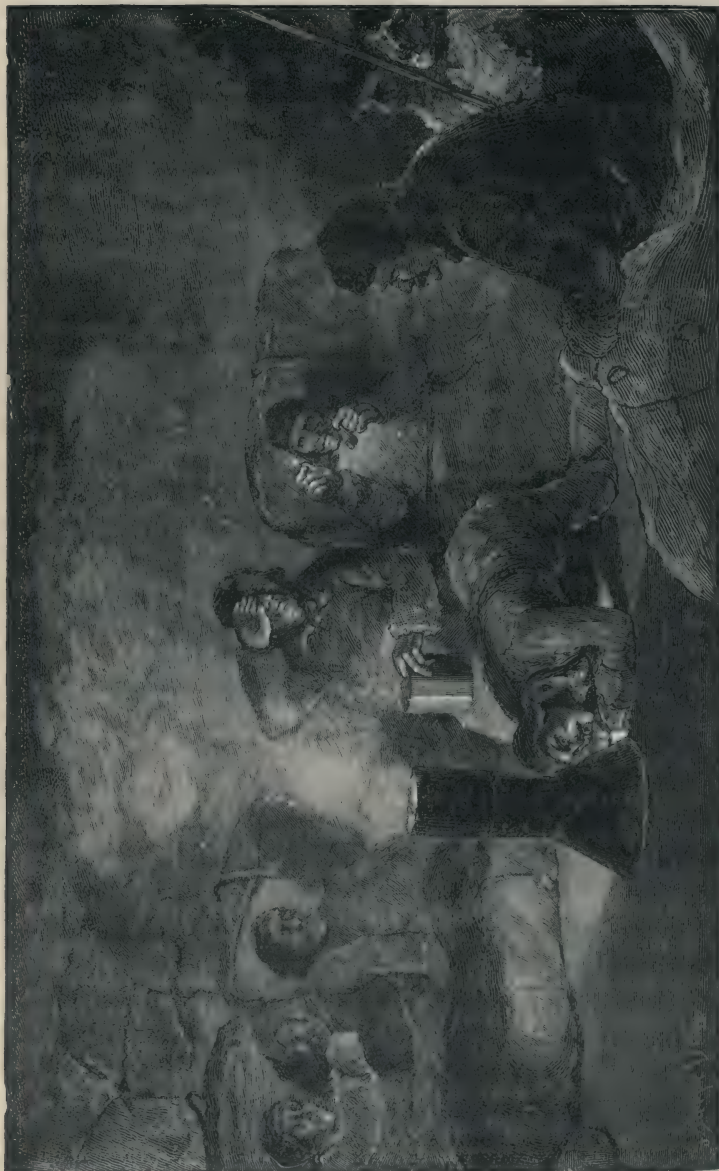
"December 10th.—A strong westerly gale, with drifting snow. Temperature, -27° (-32.8° C.). Dr. Pavy informs me that Elison's feet will be saved. Part of one hand must be

eventually lost, but no amputation will be made in our present camp. The patient is cheerful, talks much, and his face has healed to such an extent that he enjoys smoking."

"December 11th.—Biederbick, who does not agree with the doctor, told Lieutenant Lockwood that Elison would lose his feet and part of his hands, as the line of demarcation is quite plain, being just below the ankle in the feet, and through the fingers of the hands.

"Brainard overworking himself again, and was faint and dizzy this evening. I was obliged to remonstrate with him for doing other work than issuing, as I have forbidden it; but when he points out the apathy of the party, and the necessity, I am silenced. Every one does the best he can, and I regret bitterly that I have only the ability to kill time, and am unable to do besides the hard physical labor."

"December 13th.—Trouble in Lieutenant Kislingbury's mess to-day; they accuse Frederick of unfairness in dividing the rations. Dr. Pavy, Henry, and Whisler stated they had plotted to catch Frederick dealing unfairly. At my request, Lieutenant Kislingbury listened to all the members of his mess had to say upon the subject. After hearing all the testimony, to which I also listened, Lieutenant Kislingbury decided that the complaints were unfounded, and he desired that Frederick should remain on duty as their cook. I concurred in Lieutenant Kislingbury's opinion; but, in order to prevent any recurrence of such a suspicion, directed that hereafter the bread should be brought in by Sergeant Brainard, that its division should be made openly in the presence of the party by Frederick into the mess-pans, and that these portions should be hereafter distributed to that mess by the different members in turn, it being understood that the cook should receive the one which was left. We have so far avoided following the



INTERIOR OF OUR WINTER HUT AT CAMP CLAY, DURING COOKING, 1883.

rule in the 'Investigator,' where the carver took the portion remaining after each man had helped himself. One bit of flame, affording about as much light as a poor tallow candle, suffices for the entire hut. The steam and smoke which are produced in cooking are so dense that but few of the party are able to even sit up in their bags while cooking is going on, and only on favorable occasions can a man see the face of his neighbor touching him. In the midst of these dense clouds of smoke and steam, without any additional light, the cooks are obliged to divide the stews, tea, and other food. I do not believe that either cook has intentionally shown partiality to any member of the mess, or retained an extra quantity for himself. The ravenous, irritable condition in which the entire party are at present cannot but have the effect of making most men morbid and suspicious. Sergeant Gardiner lately said to me that he objected very decidedly to passing Rice's ration to him, if it could be avoided. He declared that he realized the fairness of the cooks, but that, in allowing a cup of tea or a plate of stew to pass through his hands, he could not prevent himself from mentally weighing the food as it passed, by comparing it to the portion which came to himself. Such a comparison he knew was small and petty, but his starving condition must explain and excuse it. I readily understood his feelings, as I myself have avoided handing another man's portion for similar reasons.

"Discouraging weather—high winds, with a temperature of -25° (-31.7° C.), which makes our hut even colder than usual."

Looking back on those days, when an ounce of food was worth far more than its weight in gold, I wonder only that our two cooks, Long and Frederick, aggravated and excited by the odor of their dishes, came so blameless from the ordeal of a long winter night, where all eyes watched as far as possible their every motion and action.

CHAPTER XXXIX.

WINTER QUARTERS.--(*Continued.*)

“DECEMBER 14th.—Christiansen shot a white fox to-day, which weighs four and one half pounds, and gives us such a number that we have a fox extra each week until March. They have increased our food a third of an ounce daily. Lieutenant Kislingbury’s mess in trouble again to-night regarding their soup, which was cold, some said, by the time they got it. This resulted from the new method of dividing the food, and it is noticeable that the men who complained and brought about the change in methods of serving are the men dissatisfied with the new arrangement.

“December 15th.—Trouble with water-hole again. Gardiner supplemented my remarks on North Carolina to-day by a very interesting account of plantation life in that State. Our police work is now done in rotation, one man each day being required to remove the slops, keep open the water-hole, and bring the water for the cooks. The exemptions from this duty, which requires from twenty to thirty minutes’ work once a fortnight, are as follows: Myself, Dr. Pavy, Brainard, who has his hands full issuing rations; the cooks, Biederbick, who is steward; Henry, whose toe is frost-bitten; and Israel, who, though well, is physically very weak; Gardiner’s sore hand also excuses him; and Cross, in accordance with the doctor’s advice, has been directed to saw the wood for the party, which

is done within doors, and thus prevents him from exposure to cold, to which he is very sensitive."

"December 18th.—My remarks to-day were on Florida; delightful by contrast, if for no other reason." Brainard's diary says at this date: "One phase of our life on a starvation diet is the unanimity with which every body reproaches himself for not having eaten more when he had an opportunity. No person appears to have ever disliked any dish of which he has partaken."

"December 19th.—A heavy storm to-day. Had a great deal of trouble in opening the water-hole; and, in default of volunteers, I assisted the regular water-carrier myself. The chisel was lost from the stick, but I managed to find it; and Brainard, coming to the rescue, struck water later. I am so weak that my work amounted to nothing except its stimulating and encouraging effects."

Lieutenant Lockwood says: "We are all very weak, and I feel an apathy and cloudiness impossible to shake off. It is a great difficulty to know each night just how much hard bread to save for breakfast on the morrow—hunger to-night fights hunger to-morrow morning. I always eat my bread regretfully. If I eat it before tea, I regret that I did not keep it; and if I wait until tea comes, and then eat it, I drink my tea hastily and do not get the satisfaction I otherwise would. What a miserable life, when a few crumbs of bread weigh so on one's mind! It seems to be so with all the rest. All sorts of expedients are tried to cheat one's stomach, but with about the same result."

"December 20th.—I talked on Alabama and Tennessee. I heard a fox several times last night running over the roof of the house, and sent Long out, but he never succeeded in getting sight of the animal. Christiansen happily shot a white fox which weighed four and a quarter pounds. There is great re-

joicing over the killing of a fox, not only for the prospective increase of food later, but because the entrails are immediately issued to a mess and are used to flavor that day's stew. The entrails weigh only a few ounces, but they change the taste, in imagination at least, much to our delight. Christiansen received with great joy the half ounce of tobacco which I give each Eskimo whenever he kills a fox or seal. In addition he received the heart and liver, which go to each hunter, white or native, as his perquisite. Dr. Pavy reports that the entire party are in an excellent state of health, and that their condition is wonderful considering the amount of food they have been living upon."

"December 21st.—Sergeant Brainard is twenty-seven to-day. I gave him half a gill of rum extra on that account, regretting my inability to do more for him. He has worked exceedingly hard for us this winter; and, while all have done their best, his great endurance, unusual equanimity of temper, and impartial justice in connection with the food have been of invaluable service to me. Brainard shot at a blue fox, which escaped, leaving blood upon the snow, but he followed with a lantern and discovered the animal dead some two hundred and fifty yards distant. Everybody shows a feeling of happiness that I have added a fox to our Christmas allowance, as this one was extra.

"The effect of moral influences is strongly shown by the condition of the party to-day. The fact that the sun is at its farthest from us, and must hereafter be returning, has caused a wonderful improvement in spirits. Lieutenant Lockwood exchanged places with Jewell in my sleeping-bag this afternoon, and I had a delightful conversation with him regarding the effect of the sun upon our spirits."

Lieutenant Lockwood says: "The top of the hill, the most glorious day of the dreary journey through this valley of cold

and hunger, has at last come, and now nearly gone. Thank God, now the glorious sun commences to return, and every day gets lighter and brings him nearer. It is an augury that we shall yet pull through all right. By a great effort I was able to save an ounce of bread and two ounces of butter for Christmas. I shall make a vigorous effort to abstain from eating it before then and have put it in charge of Biederbick as an additional safeguard."

"December 22d.—A clear, calm day, which has been marked by nothing special, except the sight of a fox."

Brainard says: "Mouldy hard bread and two cans of soup make a dinner for twelve. At Fort Conger ten cans of soup were needed to *begin* dinner. But even the dire calamity which now confronts us is insufficient to repress the great flow of good nature in our party generally."

"December 23d.—Trouble again with the water-hole, which could not be opened by Connell, whose turn it was. Everybody but the cooks, the doctor, the steward, and the invalids were out working on the hole. Later, Brainard succeeded in getting water. Ellis worked long and faithfully on the hole, and on his return to the house fainted, from the effects of change of air from the extreme cold to the hut, and from his exhaustion by labor. Temperature, -25° (-31.7° C.). Salor thirty-three years old to-day; received a half gill of rum extra."

The discomfort of our faithful cooks, Frederick and Long, are only faintly set forth by Brainard, who says: "The poor cooks retired early this evening, both ill from constant inhaling of smoke from the damp burning wood. While the meals are being prepared, the hut is filled with a dense smoke which nearly suffocates us. All except the cooks can protect themselves by crawling down in their sleeping-bags, but they are

obliged to stand over the fire blowing it continually, and thus suffer such misery and discomfort as can scarcely be appreciated by others. . . . We are all more or less unreasonable, and I only wonder that we are not all insane. All, including myself, are sullen, and at times very surly. If we are not mad, it should be a matter of surprise. I wonder if we will survive the horrors of this ice-prison."

"December 24th.—Dr. Pavy was attacked by a nervous chill to-day, and was for a time in an alarming condition. I ordered some rum for him, and Biederbick did everything in his power to alleviate his wretchedness, and was quite successful in the treatment."

"December 25th.—Christmas. Temperature, -34.8° (-37° C.). Lieutenant Kislingbury thirty-six years old. Our breakfast was a thin pea-soup, with seal-blubber and small quantity of preserved potatoes. That of the other mess was similar to it. Later two cans of cloudberry were served to each mess, and at half past one o'clock Long and Frederick commenced cooking dinner, which consisted of a seal stew, containing seal-blubber, preserved potatoes, and bread, flavored with pickled onions; then came a kind of rice pudding, with raisins, seal-blubber, and condensed milk. Afterward we had chocolate, followed later by a punch made of a gill of rum and a quarter of a lemon, to each man.

"The idea of seanting ourselves for a comfortable Christmas has borne good fruit, and is now heartily commended by all. There was a great deal of kindly feeling and good-will shown to-day, and a general desire was expressed to heal over any old wounds or uncharitable feeling. Late in the evening the records left by Lieutenant Garlington and Mr. Clay's letter were read. Everybody was required to sing a song or tell a story, and pleasant conversation, with the expression of kindly feel-

ings, was kept up until midnight. We had Danish, Eskimo, French, German, and English songs. One event of the evening was the reading of a birthday bill of fare, which had been made up by the party for future birthdays. The good feeling burst forth in cheers for myself, Elison, our crippled comrade; for the cooks, and for Rice, who goes to Littleton Island the earliest moment in February. Brainard replaced the broken distress flag-staff facing the Greenland coast, and enthusiastically predicted that Lieutenant Garlington would visit us during the full moon in January, an opinion shared by Pavy, Kisslingbury, and others, which I cannot participate in, but am reluctant to discourage."

Brainard writes: "The spirits of the party are wonderfully joyous and exuberant. If they continue as at present, there is little danger of our losing our minds. What a contrast is ours to the Spitzbergen party of walrus-hunters, who perished owing to depression of spirits, although having an abundance of food!"

"December 26th.—Brainard shot a blue fox weighing three and a quarter pounds. Frederick's eyes are so much inflamed by smoke while cooking that Bender has temporarily relieved him."

"December 27th.—I talked an hour this morning on Kentucky, my remarks being supplemented by Jewell, who gave an interesting account of the manner in which horse-breeding is conducted in that State; Jewell, having made a specialty of the pedigree of horses, whiled away an hour or two for us very pleasantly. The temperature is very low, down to -40° (-40° C.)."

"December 28th.—To supplement our scanty fuel we are burning rope, which creates a dense smoke very irritating to our eyes and throats.

"Quite a discussion regarding a proposed experiment for cooking with blubber, which turns on using alcohol or blubber, for what is used of one is saved of the other. It is uncertain whether our fuel will hold out or not, and from present appearances the water-hole cannot be long kept open. Objections are made to using blubber for light even, except during cooking, but I believe mental occupation, such as reading, is worth much more than the blubber burned, even if the light does not do us physical good. The information we have picked up from the few books abandoned by Lieutenant Garlington and the discussions which have arisen from them have tended to keep us alive."

"December 31st.—A severe storm last night, which lasted into to-day, and was followed by another gale at noon. The water-hole froze up again, and we had great trouble in opening it, which made all gloomy; but the men were again in good spirits after water was obtained. There has been a good deal of trading of rations among the party to-day, based on the preference for one kind of meat or bread or particular article of food over another. I talked an hour to-day on Michigan, my remarks being supplemented by Israel. Cross' feet trouble him to such an extent that Bender and Schneider have been lately sawing the wood. Commenced melting ice to-day over the blubber-lamp to obtain water for dressing the wounds. I reproach myself that this has not been done before, as considerable alcohol could have been saved. I lay awake until midnight watching the Old Year out and the New Year in, wishing the party 'A Happy New Year' immediately after the stroke of midnight."

"January 1st.—Commenced the New Year under good auspices, as Connell thought he could see the Greenland coast, and the sound has apparently frozen over. Sergeant Cross and Lieu-

tenant Lockwood show signs of weakness, the first I have detected. I visited Lieutenant Lockwood, and fully advised him as to how matters went and what my opinions were on many subjects. I urged hopefulness on him, and am sure the visit did him good. The only thing extra for the New Year's Day were cloudberries and a fourth of a lemon and gill of rum to each man. Lieutenant Lockwood spilled his tea, which was made up to him by contributions from several of our mess. Brainard shot at a fox and missed him—the first time, I believe, this winter that he has missed any game. Temperature, -32° (-35.6° C.).”

“January 2d.—Owing to a defective cartridge, Connell missed a fox to-day. The doctor severed the fragment of skin which held Elison's right foot to his ankle unknown to the patient. Made the long-talked-of experiment with blubber to-day, using two pounds for that purpose, and found that it heated to the boiling-point two and one-half gallons of water, and leaves an eighth of its weight in tried blubber. With it the first pot boiled in forty minutes. We return for the present, however, to the use of wood as fuel, and I have ordered the remainder of the blubber to be used for food. A new water-hole was commenced to-day. Dr. Pavy began speaking French to me, saying that he found it easier to speak in that tongue than in English. Lieutenant Lockwood exchanged places with Jewell in my bag, and passed last night and to-day with me. I have talked very encouragingly to him, and he is in a better and more hopeful frame of mind.”

“January 3d.—A brilliant aurora from 3.30 to 5 P.M. to-day. Brainard wounded a fox, but he escaped. Such incidents always depress a man. Dr. Pavy cut off one of Elison's fingers.”

“January 4th.—Brainard reports that a hole has been cut through the canvas roof of the storehouse, and a small piece of bacon fished out. This bold attempt to steal our food gives me

great uneasiness for the future, but the general sentiment is still strong and hearty in favor of equitable division among the strong, and such consideration toward the feeble as is possible. Five foxes have been seen to-day, and a blue one shot by Brainard. Instead of the usual geography, I read an hour or more from a statistical book which Lieutenant Kislingbury brought from Conger."

"January 5th.—Trading, which at first had a good moral effect, is becoming harmful, and I am discouraging it as much as possible. Bender talked to us for an hour or more this evening regarding his tramps through Germany while an apprentice, and gave an interesting account of gambling life at Baden-Baden. Temperature, -35° (-37.2° C.)."

"January 6th.—Elison is doing very well, and the doctor now thinks he will live. I have been obliged to forbid wagers for food or drink, or the trading of provisions for either rum or tobacco. Happily but few have any inclination in either direction."

"January 7th.—Biederbick talked this evening upon home life in Germany, and I discoursed an hour or more this forenoon regarding Minnesota, my remarks being supplemented by Kislingbury.

"Brainard discovered to-day that some one had made a hole with an axe in one of the barrels of bread, and had taken out several pounds. He suspects the thief, but has no direct proof. Quite a number offered an ounce of bread a day to keep the thief from temptation if he would only confess and repent. The guilty man kept his counsel, evidently distrusting the gift. It appears that some one in Lieutenant Kislingbury's mess has taken a piece of bacon from one of their pots, where it was put by their cook. Complaints have been made that in the darkness at night, after the Eskimo lamp is put out, some one has

been in the habit of scraping the rancid seal-oil out and eating it. Every effort has been made to discover who it is that has been guilty of these practices, but without results. Read half an hour this evening out of my diary for 1883, so that the party might know what was done a year or more since."

"January 8th.—I talked for a long time on Iowa this morning and also alluded to the fact of its being the anniversary of the battle of New Orleans. A storm set in this morning from the west. The extract of mutton issued to our mess turns out to be tainted; but, strange to say, it was relished very much, an indication that our taste is sadly blunted.

"Brainard has shown signs of weakness lately from overwork. I offered him an increase of an ounce of bread daily, but he declined to accept it, promising, however, that he would advise me whenever he felt that he could no longer perform his arduous services without it."

"January 10th.—I ordered every one to carry out instructions as to their health given any man by Dr. Pavy. In consequence Ralston and Ellis are to stop smoking tea-leaves, a solace I am loath to deprive them of, but which cannot be safely indulged. I have discountenanced the practice, but have not prohibited it in any other cases."

"January 11th.—The day a very fine one. Succeeded in getting Cross out for a little exercise. He has done no work lately, and the doctor says he has been too much in his sleeping-bag. Ellis somewhat better. Kansas dilated on by me to-day."

"January 12th.—Elison is thirty-four years old to-day. He is cheerful and doing wonderfully well, although both feet and the greater part of both hands are gone. I gave him a half gill of rum to celebrate the day. The doctor reports that Cross', Schneider's, Lynn's and Ellis' mouths are looking as though

they might have a touch of scurvy. In accordance with the doctor's recommendations, I forbade to-day the smoking by any one of tea or any other substance than tobacco. The strong wind which sprang up last night has continued to-day. Lieutenant Lockwood is worse, being very weak, and also suffering somewhat from diarrhoea.

"The water in the lake has gradually grown very salty; evidently the sea communicates freely with the lake, and the fresh water has all turned to ice. Fuel is scarce, and now the water for tea must be melted from the fresh ice. This announcement was a great blow to the party, but I have more than counteracted the effect of it by directing Brainard to permanently increase the bread ration half an ounce daily. Brainard's reports as to how the bread is running by his patent scales enables this increase to be made. The exact condition of our larder is reported to me weekly and privately, so as to avoid pressure for a change in our ration."

"January 13th.—Lieutenant Lockwood gave me much anxiety all night through, as at times he seemed to be decidedly out of his head. It appears that he has been saving up small amounts from each day's food; and, from his own account, he ate to-day twenty-four ounces of solid food; an imprudence which has tended to break him down. He sees everything double, and is very weak. He wanted rum frequently to-day, which I was unable to give him. His Sunday allowance was issued to him yesterday, in accordance with the doctor's advice. The doctor forbade his smoking even tobacco for the present."

"January 14th.—Lieutenant Lockwood exchanged places with Jewell, and slept in the bag with me last night. He was so weak this morning that I was obliged to assist him in turning over in the bag, as well as in sitting up for his breakfast. He feels the lack of smoking very much, and says it is a great depriva-

tion. Cross, the doctor tells me, has marked signs of scurvy. To-day he has shown mental weakness, and several times begged for rum. He is very badly off. In accordance with the doctor's advice, he was set to sawing wood again, as the doctor says exercise is absolutely necessary in his case. Ellis and Schneider are better. The doctor says, in his opinion, there are several of the party who cannot possibly cross Smith Sound in their present condition; a statement which may be true, but I refuse to believe it as yet.

"Ralston, Lynn, and Jewell were aroused for exercise with great difficulty. This constant inciting of others to energy weakens me greatly, being a steady strain on my strength. The increase of bread which I determined upon Saturday commenced to-day. It is but half an ounce, which is, however, a great deal to us. The lake-water which we are yet using in our stews is very salty, and causes much thirst in the party. Talked on Nebraska, my remarks being supplemented by Lieutenant Lockwood. We are burning boot-soles at present."

"January 15th.—Lieutenant Lockwood still in the bag with me, and I had a great deal of conversation with him to-day. He is somewhat better, and no longer sees double as he has been doing for the past two days. He admitted being very much depressed, and laments it as one of his characteristics. He acknowledged to me that the fear of open water cutting us off from crossing to Littleton Island this spring has given him great and constant anxiety the entire winter. In consequence of the necessity of melting ice hereafter for all our water, I was obliged to reduce the quantity of tea, so that hereafter we have but half allowance. It comes very hard upon many of the men. I am able to stand it myself, and have taken some pulverized ice in a rubber bag, which I have melted by the heat of my body to furnish drinking-water for others. The party

are somewhat depressed by the reduction of water. I talked for an hour upon the Indian Territory. Conversations of this character are not as popular as they have been, and they are exceedingly trying upon me, leaving me perfectly exhausted when I am through."

"January 16th.—Lieutenant Lockwood with me, and is somewhat stronger, but cannot get up without assistance. For the first time since our deprivation I heard him complain of the ravenous hunger which troubled him. In consequence I offered him this evening my ration of beef, four ounces, which, however, he declined, saying that he felt my need of it was as great as his own, and he must refuse. I might here add that Sergeant Israel has several times, when ill, been offered a small quantity of my rations, but always declined to receive it. The day has been very windy and uncomfortable. Cross is much weaker to-day, and was unable to walk. The doctor seems to think that Lieutenant Lockwood has improved somewhat, and has permitted him to smoke a pipeful of tobacco to-day."

"January 17th.—Lieutenant Lockwood still in my bag. He slept well last night, but is exceedingly weak. I have been obliged to assist him every time he finds it necessary to change his posture, no matter if it is even to turn from one side to the other. The doctor told me this morning that Lockwood was in a dangerous condition, and in consequence I urged him to write to his family. Cross appeared to be about the same this morning, and was up at work splitting wood for exercise. Later, however, he seemed worse; and, in consequence of Bender's complaints, I put him in Lieutenant Lockwood's bag, having Jewell take Cross' place with Bender and Henry. The doctor this evening says that Cross is in a very critical condition, and undoubtedly stricken with scurvy. Putting him in the single bag makes it more comfortable for him, and brings

him next to Biederbick, who is to care for him. It is interesting to note that Elison does not yet know of the loss of his feet, but frequently complains of pain in the soles or toes. An aurora was seen this evening at seven o'clock. Temperature, -36° (-37.8° C.)."

"January 18th.—Cross died to-day, at about 2 P.M. My attention was called to him by Jewell, who slept next him, about two o'clock in the morning, and, on lighting the lamp, he was found to be unconscious and partly out of his bag. The doctor examined him, and, by his advice, I ordered some brandy and soup to be given him, which were taken with great difficulty. He never recovered his entire consciousness. The doctor, after examining the body, reported to me, in French, that there were very pronounced signs of scurvy, and that his death must be attributed more particularly to that cause. He said that the dropsical effusion of the heart, which he stated to the entire party as the cause of death, was induced by insufficient nutrition, which, of course, means starvation. After Cross' death I made some remarks to the entire party, stating the general cause of his death to be that which was given publicly by the doctor. In order not to excite a feeling of depression among the party, I ignored the question of scurvy or starvation. Biederbick, Brainard, Israel, Lieutenants Lockwood and Kislingbury, however, are aware of the facts. I enjoined the party to take courage, and not let this death have a depressing effect upon their spirits, pointing out that Cross' constitution had been undermined by his early habits, and that even when at Conger he had not been allowed to do field service, owing to his impaired physical condition. The party during the evening seemed to be in unusually good spirits, everybody making an effort to encourage others. Jewell's mouth looks very badly to-day. The doctor now makes it a rule to examine the mouths



OUR FIRST FUNERAL—JANUARY 20, 1884.

of the entire party each morning. The day was a fine, clear one, but very cold; the temperature -40° (-40° C.). Lieutenant Lockwood is a little better, but still very weak."

"January 19th.—The temperature below the scale, which is -42° (-41.1° C.), all day. Cross' body was sewed up in sacks and canvas this morning by Brainard and Biederbick, who performed this last service most tenderly. About noon I read the Episcopal burial service over Cross in the hut, and shortly after we went with him to the grave. Lieutenant Kislingbury and six men dragged the body on the English sledge, covered by the American flag, to the summit of the hill beyond the southeast end of the little lake, which I called Cross Lake. I accompanied the party, but the rest of the men did not go to the grave, owing to the limited number of Arctic overshoes and to the extreme cold. Biederbick cast the dust on our first dead. The grave was dug fifteen inches deep—as far as our condition and the lack of proper tools would permit. A salute was to have been fired over the grave, but later it was thought inadvisable to use the ammunition for this purpose. All due marks of respect were paid the body at the house. Lieutenant Lockwood made some remarks concerning the dead man, who would have been forty to-morrow. We find that he had saved up a considerable quantity of bread and butter for the purpose of celebrating his birthday.

"Owing to Sergeant Brainard's report as to the manner in which the bags of bread are overrunning the estimate, I was enabled to-day to increase the bread ration a half ounce, which hereafter gives us seven ounces daily. This increase to a certain extent dispelled the gloom caused by our first funeral.

"Lieutenant Lockwood yet remains in my bag, and his presence has been a great comfort to me mentally, although the tax upon my physical strength has been great in assisting him to

rise for meals and to change his position while in the bag. Gardiner was twenty-seven to-day, but the only thing I had to give him, besides my good-will, was a half gill of rum. Ellis is the only one of the party who seems to be particularly depressed by Cross' death."

"January 20th.—The weather remains calm, clear, and very cold, the temperature being still below the scale. Lieutenant Lockwood made up his mind to-day to leave me, and so returned to his own bag. He is exceedingly weak; too weak, in my opinion, to be alone. I have been able in a manner to care for him. But as he expressed a decided preference for his own bag, owing to the room therein, and his ability to turn over without discommoding others, it settled the question. The party has been in excellent spirits all day."

"January 21st.—I regret that I have not insisted on Lockwood's remaining with me. Biederbick says that several times during the night Lieutenant Lockwood was evidently wandering.

"He crawled over to my bag this afternoon, saying that he had something private to say to me. He then said that he felt he was in an exceedingly feeble condition; that it had been evident to him for several weeks that he was gradually breaking down, and that he had said nothing to me for fear of the injurious effect it might have upon the spirits of the party. He thought he had improved slightly within a day or two, but it was evident to him he would never be able to cross to Littleton Island with us on March 1st, the day on which I proposed leaving.

"I told him that possibly he might be, but in case he was not, it would be necessary for us to haul him as well as Elison. He said that the addition of his weight to the load must certainly prove destructive to the party; and that he requested,

as a favor to him, that when March 1st came I should give him his twenty-fourth part of the remaining rations, and leave here without him. He argued that if there was a party at Littleton Island, it could reach him and bring him back before his rations were gone; but that if there was none there, he must perish in any event. I said that I was sorry he had such an estimate of my character as to make a proposition of that kind to me; that, as commanding officer of the expedition, my duty obliged me to care equally for the party; but that if any favor was shown, or any sacrifice needed, it must invariably be shown in the future, as it had been in the past, toward the sick and helpless, and that I begged he would never mention such a subject to me again, as I could not think of abandoning any member of the party. I added that I appreciated his feelings of self-sacrifice in regard to the matter, but that to accede to his wishes would be a change of policy which I could not sanction; that he well knew I had persistently opposed any plan or arrangement which in any degree indicated a desire to save a portion of the party at the expense of the rest. The doctor later informed me that he deemed it necessary that Lieutenant Lockwood should stop the use of tobacco entirely.

“Jewell was exceedingly despondent last night over Cross’ death, but to-day I succeeded in inspiring him with new courage. Rice added very materially to the good spirits of the party by an exceedingly interesting account of life and experience in the West India Islands. Brainard discovered to-day that at some time twelve cans of milk have been stolen. There is an intense feeling among the party over this news. In order to counteract the depression caused by Cross’ death, and by the loss of the milk, I decided to increase the seal-blubber and hard bread slightly, so that hereafter the weekly ration for each man will be eleven ounces of blubber and fifty-seven of bread. The

announcement had an exceedingly good effect upon the party, who hail the increase with such joy and pleasure as would seem incredible to the rest of the world."

"January 22d.—Lieutenant Lockwood was in very depressed spirits this morning, owing to his deprivation of tobacco. It is to be noticed that a similar effect has been produced on every man when his supply has given out, or he has been directed medically to refrain from the use of it. Later in the day, however, he was in a better frame of mind, and seemed somewhat stronger. A mattress which was given during his sickness to Kislingbury, I assigned to-day to Lieutenant Lockwood, to whom, with Dr. Pavy, it originally belonged. My own mattress, now used by Elison, has never been slept on by me. Happily the general sentiment favors all consideration to the feeble. Jewell seemed despondent again to-day, and was disinclined to follow the doctor's instructions on several points, which I, however, have told him must be rigidly obeyed. Bender and Henry to-day were impudent and insubordinate in their language; the first instance of such spirit on the part of the enlisted men."

"January 23d.—A very strong gale has prevailed to-day, which sent the temperature within the house below 20° (-6.7° C.). I spent some time in giving a very elaborate account of San Francisco, and also read a great deal to the party from Spoford's American Almanac. The statistics regarding crops and articles of food are extremely interesting, as well as tantalizing, to us."

"January 24th.—I introduced a chronological table to-day, for a change in our mental amusements. The spirits of the party have been excellent, owing to the increase of ration, planned some time since, going into effect."

Of this Lieutenant Lockwood says: "The bread loomed up

in the plate to-night with a most comfortable appearance. . . . Felt well to-day. It is a great effort for me to expose my hands long enough to write this journal; they soon get cold and numb."

Sergeant Brainard says: "The general health of the party appears to be improving slightly under the late increase of ration. The social barometer has evidently risen several inches in the last two days."



Hospital Steward Biederbick.

"January 25th.—Biederbick is twenty-five years old, and was given, as has been customary, a half gill of rum to celebrate the event. He stands his hardships and privations exceedingly well, and although as steward he has been assiduously and constantly engaged in caring for the sick and disabled, yet I think he looks the best of any man in the party. In addition to commencing the 'Life of St. Patrick,' and reading statistical information from the almanac, I perfected a

chronological list of the principal events in the history of the world. After my stock of information was exhausted, I was materially assisted by Dr. Pavy and Sergeant Israel in extending the table."

Brainard notes this day his belief from observation that Smith Sound was open, but adds: "I will not, however, speak of it to my comrades, who think it frozen over, for fear that it would cause depression of spirits. It is better that their minds should remain in a hopeful state." This willingness to bear such a burden of ill news alone was not uncommon among our party, and it materially prolonged the battle for life of many who would have otherwise sooner lost heart.

"January 26th.—I was obliged to forbid the practice of eating tea-leaves, which the doctor thinks injurious in our present condition; only a few of the party have indulged in the practice. Jewell is in an apathetic and very depressed condition, and I have exhausted my patience and ingenuity in trying to revive his former courage and energy. I commenced feeding up Rice and Jens for their proposed trip to Littleton Island. They now receive daily sixteen ounces of bread, and the same amount of meat. Frederick, our cook, and Schneider are working their best to get the travelling gear into proper condition for the *forlorn hope*."

"January 27th.—A clear, fine day, with increasing light; temperature, -36° (-37.8° C.). Owing to the disinclination of several of the men to follow the doctor's instructions, and to avoid the eating of tea-leaves, I to-day ordered that they be thrown away in future. We are burning our old leather boots, mixed with other fuel. Lieutenant Lockwood appears weaker. Ellis and Jewell are apathetic. Dr. Pavy and I discoursed on travel in Europe for the interest of the party. It is remarkable with what monotonous regularity I ask Alison

how many tons of various articles of food are exported from the United States yearly."

"January 28th.—Brainard's favorable report as to how the last bag of bread ran, and the increasing weakness of several, caused me to order the issue of sixty ounces of bread weekly from to-day. I ordered besides a half ounce of seal-blubber and an ounce of bread extra for to-morrow's stew, which has had good influence upon the men. Elison is to have three ounces extra meat on certain days, which I shall see that he gets. Lockwood appears to be saving up his food, contrary to the doctor's advice, and in consequence was directed to eat his allowance daily. He appears at times to wander, and then again to be in his senses. He is somewhat stronger to-day. Frederick commenced enlarging Rice's sleeping-bag and putting it in comfortable condition, so it can be used in the trip for crossing. Four ounces of blubber are to be given each day to Rice and Jens until they start across. Drilled Brainard and one or two others this evening in the chronological table. 'Coningsby' was finished last night, and our attention is now directed to Kane, whose record of his starvation diet creates in us an indescribable longing for even half as much food as his men had. Brainard saw a white fox, but unfortunately lost him, owing to a defective cartridge or imperfect lock. Mercury frozen."

"January 29th.—Chronological table by me, supplemented by a physiological lecture from Dr. Pavy. Lieutenant Lockwood's strength appears about the same. It is necessary to help him in and out of his sleeping-bag for his exercise in the passage-way, which is enjoined several times a day. Iron is issued daily to him, Rice, and Jens, and to the rest of the party, except myself, on alternate days. A fox was seen to-day, but unfortunately there was no gun. Bender was ordered to

fix it yesterday, but did not. We are using English tea which is damaged. There are many lively discussions as to its merits, compared with other tea."

The bluntness of our taste at that time is instanced by the fact that on one occasion our cook forgot to put the tea in the pot, and no one detected the omission, not even the cook himself, until he found the tea measured out in a can after he had drank the dirty water.

Lieutenant Lockwood says: "Several wordy disputes during the day; among others, one on the difference between coons, opossums, etc. We have a good many of these disputes, which often start off without any one fully understanding what any one else means. . . . One of the annoyances of this life is the difficulty we have in trying to cheat the stomach, and make our dole of food seem more than it really is. It is pitiable the value one puts on a miserable little piece of hard, coarse ship-bread."

"January 30th.—The shot-gun was fixed last evening by Long, Bender having neglected it. Schneider made a pair of blanket socks, and Frederick worked on Rice's outfit, while Bender commenced a lamp for Rice's use. Ralston made some stearine candles, and I worked an hour copying meteorological records to be carried by Rice to Littleton Island, and there deposited. Most of the party believe that Lieutenant Garlington is at Littleton Island, with ample supplies from the Yantic; but I have distinctly announced that I count on nothing but a very small cache, not believing that Lieutenant Garlington landed on his way north. There has been much dispute on this point, as Lieutenant Garlington's record assures us of a cache at Littleton Island, but does not say that he examined it. The same notice assured us there was a whaleboat at Isabella, which could not be found. The day has been very calm and clear.

The last day of January was spent in arrangements for Rice's trip to Littleton Island. I wrote letters to Garlington, General Hazen, and to my wife, and drew up wills for Long and Ellis. Frederick and Bender worked hard all day on Rice's outfit. It was a critical time for us. Twenty-four yet remained alive, of whom twenty-two were in comparative health and strength. Though haggard, emaciated, and suffering, we were yet confident and hopeful. We hoped that Smith Sound was frozen over, and that if Garlington failed us at Littleton Island, yet Rice would bring to our help the gentle natives of Etah, who never failed Kane and Hayes in their hours of need and danger. Once among these Arctic Highlanders, we knew our safety would be assured.



Rock Ptarmigan.

[The only winter bird of Grinnell Land.]

CHAPTER XL.

PREPARATIONS TO CROSS SMITH SOUND.

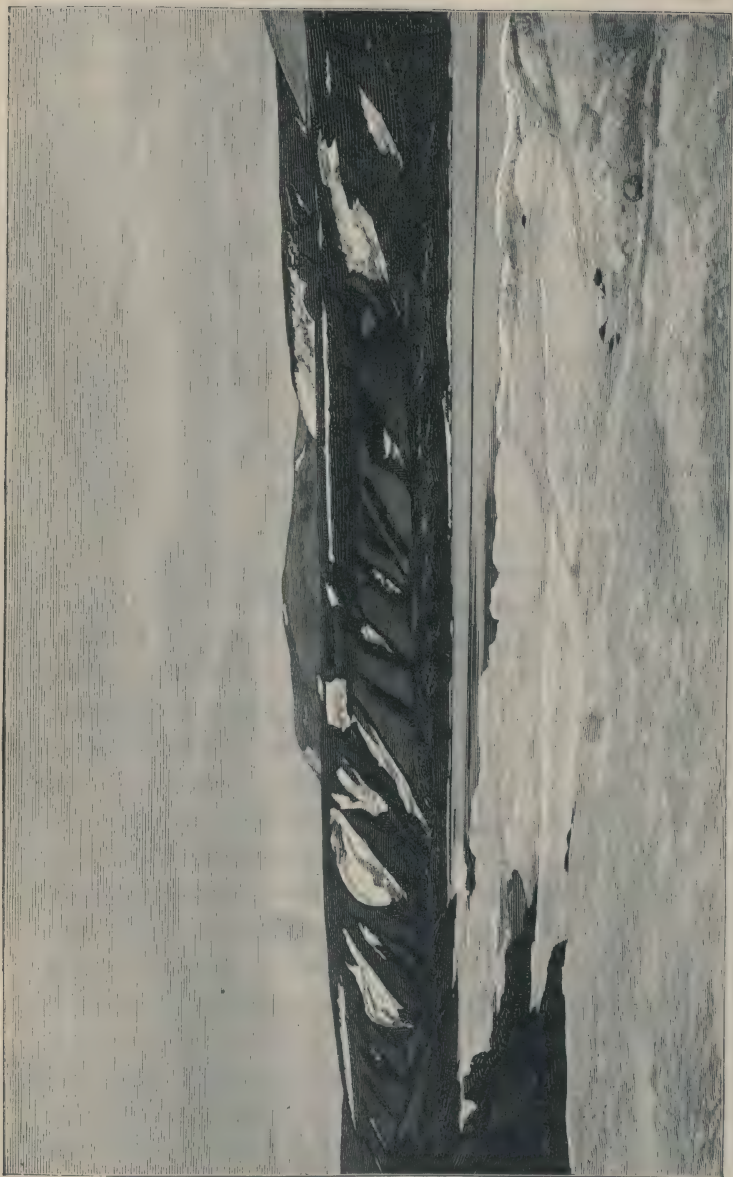
“FEBRUARY 1st.—The doctor thinks Lieutenant Lockwood weaker; and in consequence, although the doctor has not recommended it, I have decided to issue to him daily an ounce each of bread and meat. This issue has been made known only to Brainard, Long, and Biederbick, as I desire to see whether this small amount of extra food will be of any benefit to him, the doctor insisting that his present weak condition results from mental depression rather than from lack of food. At the same time I announced to the party that from Sunday next we would have sixty-four ounces of bread and six ounces of dog-biscuit weekly, leaving us twelve ounces of bread daily from March 1st when we attempt crossing. The party are in very good spirits over the announcement.

“Bender, however, showed an insubordinate disposition to-day, and refused to obey my orders when I interfered to stop a violent and bitter discussion between him and Whisler. In consequence I sent him out of doors, with directions that he remain there until he was willing to obey my orders. He remained out about an hour before he would submit. Ralston made some candles from stearine to-day. I worked an hour, and completed my meteorological and other records which are to be sent by Rice. The day has been cloudy, with very low barometer and some wind. One blue and two white foxes have been seen. Lieutenant Kislingbury's nose bled very freely this

evening. Lieutenant Lockwood was very weak and childish and I am quite worn out by this continuous strain on me.

"I have given the letters, records, and his orders to Rice, who leaves in the morning to cross Smith Sound to Littleton Island. I send a list of articles most needed here, if he finds, as I fear not, a party at Life-Boat Cove. If he does not, he is to proceed to Etah, and hire natives to cross with sledge and dogs, leaving Jens behind. I give Rice needles, etc., for presents to the natives. The men generally are confident and hopeful, and I cannot discourage them; but, on the other hand, deceive no one by holding out false hopes."

"February 2d.—An important day for us. I called the cooks at 5 A.M., an hour earlier than is usual. Rice said that his outfit was perfect. I gave him and Jens four ounces extra of roast beef for breakfast this morning. Long killed a blue fox shortly before their departure, which we considered a good augury. They got away at 8.45 A.M., accompanied by Brainard and Christiansen, who carried their packs half way to the Neptune cache. Jens and Rice took six days' rations of sixteen ounces of pemmican, four ounces of blubber, twelve ounces of bread, two ounces of rum, and nearly six of alcohol for fuel, and have extra sleeping-socks, a cooking-lamp, and cup. The day was very bright and gives marked signs of the sun, which returns to us in about a fortnight, and Henry succeeded in reading the thermometer at noon by daylight. It is very cold this evening, the mercury being frozen, but the moon is shining, and will be of great assistance to Rice in his crossing. It is estimated that Rice has forty pounds to carry, and Jens thirty-five. They have one of Lieutenant Kislingbury's guns, the smaller. Lieutenant Lockwood attempted to get out of doors with the assistance of one of the men, but was too weak to go farther than the alley-way."



LIFE-BOAT COVE.
(From a photograph.)

Brainard says of Rice's departure: "A tremulous 'God bless you!' a hearty grasp of the hand, and we turned away in tears from those brave souls who were daring and enduring so much for us. We waited until their receding forms were lost to view in the bewildering confusion of the ice-fields, and then slowly retraced our steps to the hut. While watching their progress I distinctly heard the hoarse grinding of the pack not far away. Of this I said nothing to my companions, owing to the depressing effect such information would have on their minds."

"February 3d.—From to-day sixty-four ounces of bread will be issued weekly, and with an ounce extra for Tuesday and Friday for the present. Lieutenant Lockwood's extra issue commenced to-day. By the doctor's advice I issued but two-thirds of his ration of rum, given in two doses. The Eskimo, Christiansen, is in a very depressed condition this morning, and talks wildly, owing partly to Jens' absence, but more, I think, to the fact that he upset last night, in the dark, the meat belonging to his mess. The men generally are in excellent spirits. The day has been a very fine one, but is threatening to-night, and the temperature has risen from -40° (-40° C.) to -18° (-27.8° C.). We all speak frequently of Rice, and my thoughts are so much with him that I sleep but little, looking to the result of his journey with so much anxiety. Issued two ounces of lard to each man this morning, having decided, against Dr. Pavy's remonstrance, that it was not possible for him to use it all for Elison's wounds. At the rate it has been used for dressing the wound, I have reserved six months' supply. All very quiet after breakfast to-day, it being so rich with the lard, butter, and seal-blubber used in the 'son-of-a-gun,' for which there was an extra allowance to celebrate our hopes.

"I find that several of the men have been eating little scraps of the cocoanut stearine which, covered with verdigris, is left

in the brass moulds, a practice which I found it necessary some time since to forbid positively. The general sentiment enforces my orders, but occasionally a man breaks over in secret. Connell and Jewell appear to be affected by the blubber, and Jewell fainted this evening in the passage-way, just after coming from out of doors. Brainard's face and limbs much swollen."

"February 4th.—Frederick had the misfortune to spill the rice belonging to his mess this morning, but gathered it up without any considerable loss. It is remarkable that the cooks have been able to prepare their food with so few accidents, considering the darkness and other great disadvantages under which they have necessarily labored.

"By the doctor's advice, I ordered that during the daytime the men keep their heads outside of the sleeping-bags, instead of keeping them covered up; and also that the butter issued for Friday should be kept until that morning before eating it. I also called the attention of the party to the necessity of obeying strictly any instructions they might receive from the doctor regarding the method of eating their food. Lieutenant Lockwood appeared stronger last evening, but this morning is very weak-minded. He can understand many things only after several repetitions of the subject-matter. I am continuing his extra ounces of bread and meat. Decided this morning, much to the delight of the men, that it would be practicable to have warm stews hereafter on Wednesday and Thursday, to consist of two ounces of lime-juice pemmican, two ounces of English beef, and three ounces of bread. Two ounces of bread each day is extra, thus making seventy ounces of bread this week, commencing Sunday. This continual changing of meals, with a small increase, has had a wonderful moral effect. If Brainard's report of a bag of bread allows three ounces

daily to be added for a week, I divide it in three or four portions. There was a strong wind in violent gusts last night, which caused me to feel very anxious for Rice and Jens. It was calm and clear, however, at nine this morning. Everybody in the morning was in excellent spirits, and Jewell was very bright. Brainard, who was seriously affected yesterday by his trip to assist Rice, was better this morning, but later he appeared to be quite indisposed. The doctor tells me that he can now answer for Elison's final recovery, and safe transportation to Littleton Island, under ordinary circumstances. The poor fellow, who has endured his great sufferings with such patience and fortitude, was out of spirits to-day."

"February 5th.—The doctor informs me that Brainard's symptoms look toward kidney trouble, and are very bad; and his chest, from certain indications, seems to be affected. He says that Brainard is in danger, unless he avoids exposure to the cold and violent exercise. Lieutenant Lockwood was much better this morning, being able to get up; but in going out he fell down in the passageway, and also after re-entering the hut. He said that yesterday his head was dizzy, and that he attributed it to stopping the use of tobacco. He yet fears the journey across the straits, saying we could cross, however, if we had enough bread and meat. We now have one-fifth more bread than I calculated on last fall. The party have improved a great deal, I think, on the small increase of rations.

Connell reported to-day that from the hill he could see the opposite side of the straits without any signs of open water. We all wonder where Rice is, and what results will flow from his trip. I spent an hour or more in giving statistics to the party. I offered to relieve Brainard in his exhausting and thankless task of issuing the week's rations, but he begged off, and I then directed him to divide his issue work into two

days, so as to avoid exposure to cold." Lieutenant Lockwood was so affected by the slight increase in our ration that in his diary of this date he wrote: "This week is to be a feast; our meals are fine."

"February 6th.—A windy day, with much drifting snow and a temperature of -20.2° (-29° C.). The much-talked-of warm stews of lime-juice, pemmican, and English beef commenced to-day. Dr. Pavy gave me a pair of dog-skin gloves, which he had loaned to Cross for the journey down, for my use in crossing.

"Lieutenant Lockwood seems a good deal stronger; and, much to my surprise, has shown a more cheerful spirit than before. I continue to issue him an ounce of extra meat.

"Later.—We were very much surprised by the return of Rice and Jens, about two o'clock to-day, quite well but much exhausted by their trip, especially Jens. Rice reports that he found open water extending from ten miles off Wade Point, and a mile off Brevoort Island, as far north into Kane Sea as the eye could reach. Happily the party does not appear to be very much affected by this unfortunate report. Rice said that at no time did he see the Greenland shore during his absence. There was much moving ice, with dense water-clouds, along the edge of the fast ice. He thinks he reached a point as far south as Littleton Island, and about ten miles distant from it. The only signs of game seen by the party during their absence were some old bear-tracks. Rice says that after a second day out Jens showed signs of fatigue and exhaustion, and frequently expressed himself as being weak and 'no good.' They got very little sleep and many falls in travelling over the rough ice in the utter darkness. The drinking-cup had a hole burned through it, and in consequence they suffered much for water. This evening, Lockwood was found up and travelling around the passage-way in his sleeping-socks."

Lieutenant Lockwood expressed the condition of affairs and the prevailing spirit when he wrote: "Of course we are all very much disappointed; the party take a bold front, and are not wanting in spirit. Our rations have been counted on to last until March 10th, there being a ration of twelve ounces of bread and ten ounces of meat for ten days in March to cross the straits. So here is the upshot of affairs. If our fate is the worst, I do not think we shall disgrace the name of Americans and of soldiers. I feel stronger to-night, but I have been in low spirits and alternately feverish and chilly. Singular, my spirits have risen this evening."

"February 7th.—Increased the ration slightly to-day to counteract the effect of Rice's return, and announced publicly that hereafter we shall have next week nearly eighteen ounces weekly of blubber and lard combined, in addition to our usual ration of several ounces. It is all a pitiful game of brag, and I shall have to reduce everything materially the coming week, but it had the desired effect. Rice and Jens are pretty well this morning, though naturally very sore. One of Rice's heels was much worn by his gear, and his nose and fingers appear to have been slightly frosted. Jens was nearly played out during the trip.

"Later, after racking my brain with a thousand fruitless ideas, I concluded to change my tactics somewhat, and so announced that it was more than probable Smith Sound would freeze over by March 1st. In such event, I argued, we could afford to deny ourselves a little, and so I had decided to cut down our bread a couple of ounces, so we would be able to remain here until March 6th, and have fifteen days' rations, on the basis of twelve ounces of bread and ten ounces of pemmican, with which to cross the straits. To give some cogency to my reasoning, I assumed that it was good logic for myself by de-

tailing five of the party on special duty, charging them to arrange everything for the abandonment of our hut and the crossing of Smith Sound on March 6th. I certainly do not deceive all the party, but probably I do some. Perhaps my plans may succeed, and this wide strait freeze solid, but I cannot now believe it. Strange to say, I never was troubled with this fear during the winter, perhaps because I was too busy doing each day that which came to me in the way of supporting and upholding the courage of the party.

“Arranged hereafter to have only two-thirds of a cup of tea, so as to save enough fuel to enable us to have warm stews daily. There was the usual diversity of expression as to the wisdom of this movement, but at any event it excites talk and keeps the party alive. Ellis and Lynn are cutting the wood this week. Jewell froze his fingers to-day, through neglecting to put on proper gloves when going out. Our poor starved bodies have not enough blood and vital heat to resist this temperature of -27.5° (-33° C.). Lieutenant Lockwood is the only one of the party to-day who has shown depressed spirits. I have been obliged to cut off, after to-day, his extra ration. He with Elison and Gardiner, have been the only ones to receive, as yet, an extra allowance.”

“February 8th.—Mercury again frozen, greatly to our delight, for a week of this weather would cement securely the ice of Smith Sound. Bender was sick during the night, and Henry, who is sleeping with him, came to me and said that Bender believed that he was dying, and that he had a feeling that he was maltreated by the cook. Everybody scouts Bender’s notions in this matter; but, in consequence of his exceedingly depressed condition, I have directed that the issue of food in his mess should be made by some member of the party other than the cook, so as to relieve his mind of even a suspicion of un-

fairness. Gardiner and others saw the Greenland coast, the sky being clear and the day very bright. After a discussion with Dr. Pavy to-day, I stopped the extra allowance of meat and bread which I had again thought of continuing to Lieutenant Lockwood, as the doctor said it was not absolutely necessary. Brainard, Rice, and Jens are better, and the majority of the party are in excellent spirits. Discussed generally the question of an outfit for crossing Smith Sound. Lieutenant Kislingbury is to ascertain what is wanting in hand- and foot-gear, Rice and Brainard to get up a list of weights which must necessarily be hauled, while Frederick, Schneider, and Ellis are to repair our clothing, sleeping-bags, etc. Lockwood was out for exercise to-day, and was so feeble that he fell down on the lake. Jens is somewhat depressed over the results of the late trip, and was found crying or moaning last night. I have encouraged him by judicious praise and hopeful expressions. I read to-day from McCarthy's 'History (of Our Own Times)' and Gardiner from Hayes' 'Polar Sea.'

"Brainard's private report to-night shows that we can remain here until April 10th, if we can subsist on four ounces of meat and eight of bread daily."

"February 9th.—Jewell very gloomy, and remained twenty-two hours in bag without speaking, or even stirring, except to eat his meals. It was with the utmost difficulty that I managed to get him out of his apathetic condition, and of course he displayed considerable temper, which is better than silence. Lieutenant Kislingbury submitted a list of hand- and foot-gear on hand and to be made. The day is very bright and almost calm. Jens has quite recovered himself, and Bender is much better. Lieutenant Lockwood is not so well to-day as usual. I told him he must cheer up; that, although some slight reduction of rations was necessary, yet I found that we could remain

here until March 10th, and still have fifteen days for crossing. This statement, as I had hoped, broke the force of my announcement that the bread ration will be reduced to eight ounces on Monday."

"February 10th.—A clear, bright day, with frozen mercury. Bender better; Salor, slight attack of diarrhœa. Jewell and Connell had to eat their breakfast in instalments, owing to the amount of blubber in the 'son-of-a-gun.' Bender discoursed this evening on Germany. Lieutenant Lockwood changed places with Jewell, and spent the afternoon and evening with me. He admits being very much depressed over our future, and laments his inability to help it. He said to the doctor that he must keep stirring him up; that he found it very trying and hard to do anything, and was beset by an uncontrollable feeling of indifference and apathy. Lockwood wanted a drink of water this afternoon, which fortunately I was able to give him from some which I had melted in a rubber-bag by the heat of my body."

"February 11th.—Frozen mercury again. Our condition regarding water is very trying, as it is a month or two since we have had any to drink. Lieutenant Lockwood, Dr. Pavy, Connell, and Henry, all expressed a strong desire for water this morning. I use no water myself, and withstand the thirst exceedingly well. Biederbick reported he could hear very plainly this morning the roaring of the ice in the straits. Lieutenant Lockwood's mouth to-day looks very bad, being raw in a number of places. He thinks the excoriation is the result of drinking his tea too hot, but the doctor privately informed me that such was not the case. Biederbick thinks that Lieutenant Lockwood's strength is improved somewhat, although he wanders at night as much as ever. The spirits of the party, as a whole, continue very good, but Whisler is very

much depressed ; he said to-day that he did not believe we would ever reach Littleton Island. He is the first one who has ever made a remark of that kind. Israel suffers very much from constipation. Commenced to make foot- and hand-gear for crossing the straits, being determined to have everything in order in case they freeze over by March 10th. Frederick, although he is still cooking for the other mess, took general charge of the work, assisted by Schneider and Jens. Corporal Salor ailing. I began to-day issuing fifty-nine ounces of bread and five and six-tenths ounces of dog-biscuit weekly. We now have a warm stew in the morning four days in the week, and in the afternoon five days in the week. Schneider acknowledged to-day that he had taken and eaten two or three pieces of bread at different times during last autumn, but denies, as he always has, any knowledge of the milk. Sergeant Brainard overhauled our remaining provisions, and found a considerable less quantity of rum than was expected, as we calculated on the barrel holding the quantity certified to by the gauger. I was very much worried over the matter, as it could not be well explained, until Israel suggested that our English measure differed from the American one, which satisfactorily accounted for the deficit. In consequence of the small quantity, I found it necessary to order that no rum should be issued hereafter except medicinally. I ought to have thought of the difference in the measures, as it leaves us now with such a small quantity of liquor. I can only console myself by the reflection that it has been sparingly and judiciously issued.

“To encourage the men, I invited every one to express his opinion regarding the methods best calculated to utilize our wretched equipment for the proposed crossing. It all seems to be a mockery, but the men are surprisingly cheerful, and enter into the spirit of it.”

"February 12th.—Temperature below -42° all day; but, notwithstanding the mercury is frozen, the water in the straits still remains open, probably in consequence of spring tides. The roaring ice, a dismal, fateful sound to us, was heard nearly all day, and dense water-clouds seen to the north and east.

"Lieutenant Kislingbury and Dr. Pavy had a very bitter discussion, which barely stopped short of personal violence. As it did not concern any official matter, I followed the rule laid down, and only interfered to save the general peace at the last. I have found that the most certain manner of retaining my influence over the men is to refrain from interference, except in official quarrels, other than by dissuasion. Bitter talk relieves the mind at times, and no blow has ever been struck; a remarkable record for twenty-five tortured and irritable men, who have not known a moment of comfort in these many months.

"Lieutenant Lockwood is stronger, and has been in better spirits to-day. He succeeded in getting out, by the aid of Eskimo Christiansen, for a short time. Dr. Pavy was accused openly, by Jewell, of selecting the heaviest dish of those issued out; and, in consequence of the fact being established by other testimony, I directed that in Lieutenant Kislingbury's mess, hereafter, the name of the man for whom any dish was intended should be designated as it was handed out by the cook. Our own mess have escaped any such condition of affairs, and have trusted implicitly in the honor of our cook. Indeed, were it not for four or five men, no complaints would have been heard from or restrictions imposed on the members of the other mess. Both Long and Frederick, in addition to their self-sacrificing duties as cooks, have repeatedly asked that a second man should divide the food, and that they might be allowed to take the dish rejected."

"February 13th.—Very cold and bright, but windy. Bache Island shows up to the north very brightly, and almost seems to reflect the sun's rays, which, however, are not due for several days yet. Dr. Pavy and Bender had violent words; in consequence of which the doctor told me he would never again prescribe for Bender unless he publicly apologized, which I told Bender he must do, although the doctor brought about the misunderstanding. Later Dr. Pavy had a quarrel with Whisler, and wished me to publicly reprimand him, which I declined, as there was no cause, the trouble having been commenced by the doctor. These continuous quarrels wear on me, for I never know how they will end, or what violence the wretched men may be tempted to commit, for in many ways death is preferable to life. I, however, keep my temper admirably for me, and smooth over troubles as best I can. I thought it best to-day to turn over to Lieutenant Lockwood a favorite pistol of his, which I brought down on my person at his personal request, and which he spoke of yesterday. His mention of it gave me an unpleasant feeling, for it looked as though he was putting his house in order. Dense water-clouds were seen to-day very near. Despite the open channel, however, the party remains in excellent spirits. Our mess met with a great misfortune this evening, as through mistake a quantity of salt water was put in our tea, and we were unable to drink it. We consequently had to go without drink of any kind, as there was no fuel with which to melt more ice. Long, our cook, felt exceedingly troubled over the mishap, but the fairness of our starving mess was such that every one cheerfully expressed himself as satisfied. Ellis to-day scraped his sleeping-bag for tobacco, and begged permission to smoke it, which I could not refuse.

"February 14th.—From to-day we are to have thirteen

ounces of seal-blubber and nearly two ounces of lard weekly. Dr. Pavy had words with Schneider, and later with Frederick, and complained to me regarding Lieutenant Lockwood. I visited Lieutenant Lockwood in the evening, and he informed me that he had implicitly followed all of the doctor's instructions. I found him quite despondent over his health, as well as our prospects. He is certainly weaker to-day, but was able to take a little exercise this morning. The doctor thinks the chances are that we shall have to haul him in crossing."

Lockwood says: "Lieutenant Greely came over to my bed awhile to make inquiries about my health, etc. He retains his strength and flesh very well, and also his spirits. We are all very dirty; our clothes covered with grease and dirt. My hands and face are absolutely black in color. I hope almost against hope that, if we are fortunate enough to find Smith Sound closed, I shall be well enough to get along without help."

"Brainard mentions that a piece of butter was stolen from his mess, and adds that 'Henry keeps his candle-moulds on the same shelf.'"

"February 15th.—Very bright, but windy. Nearly everybody expected to see the sun, as the sky was so bright in the south. Water-clouds still continue over the straits. Socks and mittens for the party are progressing well. With great exertion I repaired my socks this morning. Sergeant Gardiner found a small bag of English tobacco, which gave rise to very unpleasant talk; Gardiner promptly turned it over to Dr. Pavy, who claimed it. Schneider has replaced Ralston as our candle-maker, and we have been able for some time back to replace our Eskimo lamp by stearine candles, which give a better light and leave us the seal-blubber for eating. The stearine (cocoanut) is so strong and rancid that the doctor says its use as food would be injurious."

Lieutenant Lockwood says: "I do little talking, finding it difficult to raise my voice. I am pursued by ennui, aimlessness, apathy, and indifference, produced by hunger, cold, gloom, dirt, and all the miseries of this existence. I am very weak, both physically and morally, and find it impossible to shake these sad thoughts off; but my spirits to-day are better than usual, and those of the party very good indeed."

"February 16th.—Dr. Pavy examined all the mouths, and reported them looking well except Henry's, which is somewhat suspicious. Frederick finished a pair of boots for me for crossing, and took mine, which were large, for the use of some one else. Dr. Pavy requested two ounces extra of meat on alternate days for Elison, which I ordered, though it is hardly fair to the others, as Elison through all these dreary months has had almost double rations allowed him. I stretch a point for him, and am assured by the doctor that he is quite safe, if we can only get him across the straits and find either food or a party. Lieutenant Lockwood is better. Brainard reports that we have 265 shot-gun cartridges. The party in general continues in excellent spirits, despite the open water between us and Greenland."

Lieutenant Lockwood says: "The sun does not make us very enthusiastic. We are too near the end of our rations, with a very poor prospect of increasing them at Littleton Island. I see no chance of the straits being closed the end of the month. To my mind we must find game here, or else receive help from Littleton Island. It will soon all be decided, thank God!"

"February 17th.—Higher temperature this morning from the storm last night, but the day has been bright and calm. We have used the last of our seal-meat in a fine stew, and also the last of onion-powder, peas, beans, carrots, corned beef; and on Wednesday used the last of our English beef. In consequence

we have for future use the strongest and best food in the shape of boiled bacon and pemmican. The sun was above the horizon to-day for the first time in one hundred and fifteen days. Several, including myself, have not seen it since October 13th, when crossing Rosse Bay. Our fuel in wood is holding out remarkably well, and will do probably until March 5th. The cooks have displayed astonishing skill and economy, and have worked wonders with both food and fuel. There was no issue of rum to-day; the first Sunday we have been without it. Its absence did not seem to be much felt. I still issue a quarter of a lemon, which tastes as good as ever. We all thank God that the sun is once more back, although its rays cannot reach our hut for many days.

"February 18th. — Lieutenant Lockwood seems better, though of course very weak. Remarkably fine and clear morning. Issued this morning two ounces extra of American roast beef, which was very much appreciated. Rice visited the summit of Bedford Pim island, and had a fair view of the straits. He reports that the summit of the island is level, and sandy in places, with occasional immense snow-drifts, which feed the glaciers near us. He saw much open water with many large floes of ice, which to the east (true) appeared to touch and afford a possible passage across. A horseshoe curve above or near Cape Louis Napoleon indicates fast ice in that direction. It is apparent that only cold weather is needed to solidify the ice from Cape Sabine to Cairn Point, and so insure our crossing. The spirits of the party are improved by this report.

"Bender complained again this morning of short weight in bread, though he was offered the choice of any plate in his mess. Brainard's feelings were much hurt by Bender's remarks, but I urged that he ignore them. Long took a trip to

the northeast some four or five miles to-day for game; the only thing he saw was fox-tracks.

“February 19th.—A strong southerly gale set in last night, which abated about noon to-day. It raised the temperature above zero (-17.8° C.), and caused much dripping from the roof of our quarters, wetting and making us very uncomfortable. I have one very unsatisfactory consolation, that the ice has so melted above me I can sit up erect without my head touching it. Bender and Schneider had a quarrel in their sleeping-bag last night, and came to blows, the first which have passed in the expedition. As far as I could gather, Bender was the aggressor. I reprov'd both men, however, and told them such a condition of affairs was outrageous, and must not occur again; that we were men, and not brutes. Both felt that public sentiment condemned them. Elison is steadily improving, and Lieutenant Lockwood appears a good deal better. Ralston is threatened with a felon, an experience which several have had.”

Brainard's journal says: “Smith Sound was an open sea; no ice of any kind was visible on its surface, and the waves and whitecaps were rolling in against the edge of the fast ice with a dismal roar, which sounded in our ears as the knell of our impending doom.”

“February 20th.—A southerly gale part of the day. The cooks went hunting, but saw nothing except a raven, which is our first bird—possibly our neighbor of last fall, who left us in November. As Brainard remarked, we have suffered too much to allow this bird of ill omen to instil any feeling of superstition in our hearts. Lockwood is doing very well at present, and his mind is somewhat stronger. Rice started to climb the hill for a view of the straits, but was obliged to return, owing to the high wind.”

“February 21st.—Lieutenant Lockwood about the same. He

has had very little to say to-day, and is evidently much discouraged. He amused us yesterday by suggesting that we could not eat crow, and hoping that our hunters would not kill the raven, as he had come back to keep us company. I said that I should shoot him for deserting a military command. Frederick and Biederbick to-day got his (Lieutenant Lockwood's) clothing and outfit together for crossing the straits. The sun has not yet been seen by any of the party, but its rays have appeared to the northward, gilding the mountains near Cape Frazer. The English sledge, which had been drifted over with snow, was dug out by the party to-day. May we once again load and haul it over the Arctic highway!"

"February 22d.—Received this evening from Lieutenant Kislingbury a communication, recommending that, as soon as Smith Sound freezes over, he, with a party of the strongest men, be allowed to cross to Littleton Island for game or assistance. He based his recommendation on the ground that we cannot cross as a party. This proposal strikes me in no other light than an abandonment to their fate of the weak of the party. Eight men cannot be depended on to make this trip of seventy-five miles and not disable a man. Any accident in travelling would sacrifice the entire party, unless the disabled man himself was sacrificed. It being Washington's Birthday, I celebrated it royally with a "son-of-a-gun" and cloudberry, together with a fine pemmican stew. It took only forty ounces of extra lard, and as much extra bread, to make everybody happy. As usual the stew was 'the best yet.' God pity us wretched mortals!"

"February 23d.—This morning I brought to the attention of the party Lieutenant Kislingbury's recommendation. I pointed out that preparations for crossing as a party were rapidly progressing; and told them that the party cannot be



ARCTIC HIGHLANDERS—SAUNDERS ISLAND NATIVES.

(From a photograph of the Relief Squadron, 1884.)

divided with my consent; that whether we can cross as a party or not could be determined only by trial; and, until we had exhausted all efforts, no man, as long as my authority remained, should be deserted or abandoned. If any messenger for a forlorn hope was needed, it should be the strongest and fittest man at that time. Nobody seemed to indorse Lieutenant Kislingbury's plan. Dr. Pavy spoke to me most strongly against it in French, although he refrained from expressing his opinion publicly. Lieutenant Lockwood was very much affected by the proposition, and called our prospects exceedingly dismal, but gave no opinion regarding it. Indeed, we have not been able to obtain one from him for several weeks; and, in view of his willingness to sacrifice himself, as shown by his proposition of a month since, it cannot be expected that he would urge the strongest of the party to pursue any course which would show consideration for him. He was not out for exercise to-day; a fact which, in consequence of my mental excitement arising from the discussion of Lieutenant Kislingbury's plan, escaped me until too late to urge it. Ellis also remained in his bag, and did not work as he had promised. He is becoming indifferent and apathetic, and requires watching and urging to keep him in good spirits."

"February 24th.—Another gale last night, which continues with great violence. Will storms never cease, so that our ice-bridge may form? Lieutenant Lockwood was up for exercise this morning, but failed to get up this evening. It is evident that he has grown much weaker during the past four days. He frequently asks for information regarding our meals and other daily details. His mental condition is evident to everybody but himself, and it is exceedingly painful to me. He was so strong physically and so dependable, and in his weakness is so patient and gentle."

“February 25th.—Another gale, with drifting snow.”

“February 26th.—A heavy gale again last night, which died away this morning. The barometer rose half an inch in twelve hours. Water in large quantities, indeed a veritable sea, toward the north of us. Opinions differ as to the prospects toward Cairn Point. Some think that the bridge has formed by the ice catching, and others say not. Lieutenant Lockwood seems better, but can dwell on nothing but the subject of food. The raven was again seen to-day.”

“February 27th.—Henry's twenty-eighth birthday. I gave him half a gill of rum to celebrate it. Lieutenant Lockwood complains much of suffering from cold, although he has on five suits of underclothing. Brainard while hunting went on the hill to see the sun, but was disappointed. The last of our onions, dog-biscuit, and coffee reached.”

“February 28th.—Water appears farther off from shore to-day than yesterday, and indicates favorable conditions for freezing over. A slight misunderstanding with Lieutenant Lockwood regarding the quantity of bread issued. Some unpleasant talk followed, but he disclaimed intending to reflect on the cook or issuing sergeant. It is the first word of dissatisfaction with his rations; excusable in his condition.” Lockwood touchingly says: “Last night I had a few unpleasant words with Lieutenant Greely about a proposal to change the arrangement of the stews. Both of us were rather fixed. This constant hunger is very productive of ill-temper.”

“February 29th.—Another violent scene between the doctor and Lieutenant Kislingbury. Better this than mental apathy, since starving men cannot keep the golden mean. The small sledge was brought into the house to-day and lashed.”

CHAPTER XLI.

NEW LANDS AND VARYING FORTUNES.

“**M**ARCH 1st.—To-day is the one which was fixed upon by me last fall for crossing the straits. We have lived through to this time on a ration thought to be impossible for sustenance of life, but now the fates appear to be against us. The straits are wide open, and if we only had sufficient strength to remove the boat from the building, we could now attempt a passage partly by sledge and partly by boat. The party generally is in excellent spirits. Spring opens with twenty-two of us yet in health, although very much reduced in physical strength from the small allowance of food. Elison and Lockwood are the only really sick men of the party. Elison has improved steadily, and is substantially well, the doctor says. His wounds have healed very much, and no suppuration is taking place at present. Concerning Lieutenant Lockwood, the doctor reports his mind yet affected. Owing to the doctor's persistent reports, and to avoid any show of partiality, Lieutenant Lockwood gave up his tobacco to me to-day. The day has been clear, but very windy. The sun has not yet been seen by any of us. Two ounces extra of pork was issued to Elison.”

“March 2d.—Day stormy and disagreeable, and the sun not yet seen. The party in very good spirits, and an unusual amount of general conversation took place. There was considerable discussion as to whether the last storm broke up the ice lately formed. The last general issue of lemons, there being but

two or three left for medical purposes. Our last can of milk was opened for Elison. Schneider is to make twenty extra candles to be used in crossing. Lieutenant Lockwood appears stronger. The discontinuance of our Sunday rum was mentioned to-day for the first time, and then only by a single man."

"March 3d.—Much to our annoyance and regret, the day has been stormy and windy. I informed the party that we could hold out here, without any material reduction in our rations, until the early days of April, and can stay here until March 16th, and then have food to cross. My announcement seemed to have a good effect. Frederick made me a pair of sleeping-socks for crossing, which I hope to use, but very much doubt it. Lieutenant Lockwood visited me in my bag. He is stronger and in a better frame of mind than usual, though still despondent. He is hopeful but yet uncertain about his chances of being strong enough to walk across the straits. I told him that I intended to send a hunting party to Alexandra Harbor as soon as I made up my mind that we could not cross, and also other hunting parties into Rice Strait and near Cape Sabine. The sun has not yet been seen. The last butter was eaten to-day, and nearly all our vegetables are gone. We still have two issues of cloudberries and three or four of lime-juice. Brainard asked if I could promote Frederick vice Cross, whose duties Frederick so creditably performed. I have promoted him to be sergeant, hoping the action will have a stimulating effect, by keeping before the men a keener realization that there is yet a world and something worth striving for."*

"March 4th.—Wind and drifting snow all day, with the high temperature of -23° (-30.6° C.). It would seem as

* I regret to say that this and other similar promotions were disapproved of, on the ground that there was no precedent for them, and the promotions could not be regularly made by me.

though the elements were against us. We have two weeks, however, before I shall have to decide positively the question of remaining on this side. Biederbick was quite sick this afternoon ; he has been working too hard lately, being indefatigable in the care, not only of Elison and Lockwood, but of others who are stronger than he is himself."

"March 5th.—The last of our seal-blubber, corn, tomatoes, potatoes, and soup issued to-day—what shall we do in a few days? The storm, with drifting snow, still continues. The high wind made it very uncomfortable in the hut, sending the temperature down to 19° (-7.2° C.). In this weather frost forms and falls on us continually, wetting and chilling us to the marrow. It is with great difficulty I can manage to sleep an hour or two daily owing to the cold."

"March 6th.—The storm finally abated here to-day, but seems to continue in the straits, as many water-clouds are visible. We are to have but fifty-six ounces of bread weekly hereafter, and no dog-biscuit or vegetables; which is a great reduction, and causes much gloom. Henry complains of chest trouble. Bender to-night carelessly left the shot-gun apart, and in consequence a part has been lost."

Lieutenant Lockwood says: "I think the party are losing confidence. Food is our constant theme. Bacon rancid, and we eat the tallow in which it is packed; both are spoiled and very strong, but we eat them with relish."

"March 7th.—Calm and clear once more. Long put together the gun this morning, and went hunting toward Cape Sabine. Biederbick cooked the dinner, as Long did not return until late. He had been as far as Brevoort Island, but saw only the tracks of two foxes and two bears. Rice saw two ptarmigans on the hill, but unfortunately had no gun, and they flew away before one could be obtained. We have hopes now of these

birds, which are winter denizens, since light enough has come to enable us to see them. Lieutenant Kislingbury went to the iceberg about three-fourths of a mile distant hunting, and saw some bear-tracks. The ice is very thin in places, and he was unfortunate enough to break through and wet his feet, from which he must suffer much, as his clothing must be dried out by the heat of his own body. I and several others offered to dry pieces for him, but he thanked us and declined. Lieutenant Lockwood is in a very morbid and unsettled condition of mind to-day. Rice was sick this morning, but at noon ascended Bedford Pim Island and saw the sun, the first time it has been seen by any one of the expedition for four and a half months. Bender in a fit of passion again. I cannot endure this state of affairs much longer I am afraid."

"March 8th.—Another most violent storm last night, which yet continues; no one was able to go out, except for ice, during the day. Conversation was very general and spirits high to-day. Lieutenant Kislingbury is stiff from his wetting, and Long also from his fifteen-mile tramp of yesterday. It is astonishing to us that Long is so active and energetic."

Brainard's journal on the 8th says: "For the first time this winter hair-cutting was indulged in. Those wishing their hair cut crawled to the foot of the sleeping-bags, and the barber passed along the alley-way devoting the briefest possible time to removing the matted masses of hair."

"March 9th.—Heavy gale again to-day, which this evening approached in violence the extraordinary storm of December last. It is certain that such violent storms must break up all the ice in the channel, and I think our chances of crossing are about gone. Unless mercury freezes I shall send Long and Christiansen to Alexandra Harbor on Tuesday, and I have given orders to prepare their outfit for the trip. Brainard is anxious

to go, but I cannot spare him. Rice and Frederick offered their services as volunteers to attempt recovering the hundred pounds of English meat abandoned in Baird Inlet last November, which I declined, thinking it too hazardous a journey for so little food. Biederbick is to be our cook during Long's absence. Lieutenant Lockwood seems much better to-day. Elison is doing astonishingly well. Israel reports that his tobacco, left in the chronometer box, has been tampered with."

"March 10th.—Very heavy gale again last night, which has abated. Brainard and Rice hunted in different directions for ptarmigan, but saw none. Brainard had a full view of the straits, and reports that there is an immense quantity of ice in them, so that the chances of closing are increased. I think it is the ice driven down by the wind, and that it will change its position the first heavy tide or high wind. Frederick and Brainard, assisted Long in preparing his outfit. I allow him and Christiansen, during their six days' absence, eight ounces of meat and ten ounces of bread, six ounces of alcohol for fuel, and a pint of rum for medical purposes.

"March 11th.—Fortunately calm and clear, and the sun for the first time touched the roof of our wretched hut. I gave Long and Christiansen an extra ounce of bread and two ounces of bacon at breakfast. Rice and Ellis who went out to give them a lift, got off with the sledge at eight o'clock, followed at 9 A.M. by Long and Christiansen. Our hopes and good wishes are so much bound up in this important trip that we can scarcely wait the week to know what will come of it. There has been much discussion as to what will be its results. I am sanguine of success, owing to the many signs of game seen in Alexandra Harbor by Nares and Feilden in 1875. If the valley affords winter pasturage for musk-oxen and reindeer, we are safe, as Long is certain of obtaining game if he sees it. Lieutenant

Lockwood says that he counts on nothing but hares. Rice and Ellis returned at half past two, having dragged Long's sledge to the northwest end of Cocked Hat Island, on which they touched foot, the first white men probably who have ever been upon it. Long and Christiansen struck directly for Alexandra Harbor, the travelling being fair. Long saw a raven, but was unable to get a shot at it. Brainard saw ptarmigan tracks. Unfortunately the rear sight of Lieutenant Kislingbury's gun has been broken off and lost. It is uncertain whether the accident occurred when he was hunting a few days since or not. The day turns out to be an exceedingly fine one, the temperature -19° (-28.3° C.), which rose in the sun to -12° (-24.4° C.). The variability of spirits is shown much by a little incident to-day. Jewell has such faith in Long's success that he already imagines us supplied with game, and in consequence requested that I would permit him to go into Hayes Sound with the party that I have talked of sending for geographical purposes in May. This visionary trip I have talked of more to encourage the men than anything else. I have tried to keep in their minds the object of our expedition, and the last thing I did yesterday was to call Long to my bag, point out to him on the map just what was known of Hayes Sound, and instruct him as to the importance of noting everything to be seen to the westward of Mount Carey. 'Game in any event,' I said, 'but new lands when possible.' I have been three years in command of this expedition to-day, if my memory serves me right."

"March 12th.—A fine, clear day, which Brainard improved by hunting as far as Sabine. He was driven to the ice-foot a mile this side of the cape as the ice has broken up to a certain extent along the coast. The only sign of game was the fresh tracks of a fox. A strong westerly wind prevailed in the straits, with a great quantity of water-clouds. Bender fixed a

sight for Lieutenant Kislingbury's gun, so that the latter went hunting for ptarmigan. Israel and Jewell are again begging me to send them into Hayes Sound, if our food may be enough, for geographical work. Brainard has also volunteered, and Dr. Pavy adds his name. Frederick repaired my sleeping-bag to-day, and I took occasion to visit Lieutenant Lockwood, taking Biederbick's place, who is now our cook. I had considerable talk with Lockwood, who is improving slightly both physically and mentally."

"March 13th.—A fine day. Rice saw ptarmigan tracks, and Lieutenant Kislingbury followed them without result. Elison is much better, and on Dr. Pavy's representations of the urgent need I have increased his rations to twenty-two ounces of bread and meat, double the amount issued to others. The sun struck the house to-day for the second time, and I was fortunate enough to see it; the first time in five months, one hundred and fifty-two days. Long returned unexpectedly, at 7.15 p.m., from Alexandra Harbor, both he and Christiansen very much exhausted. They saw no game and no tracks, except of a single fox. They examined thoroughly the valleys of Alexandra Harbor, and Long visited the western side of Mount Carey, and with his field-glasses looked westward into Hayes Sound, discovering three new capes on the north side, the most westerly of which I have named Cape Francis Long. The party travelled nearly seventy miles during their absence; and their sleeping-bags having frozen up, they were unable to get into them farther than the hips, and were compelled to get what rest they could alternately, one resting while the other walked. Long was taken ill during his absence. I have deferred talking with him to-day regarding his trip, owing to his exhausted condition. We are all terribly disappointed over the result, as I had counted with some confidence upon obtaining game.

“The fates seem to be against us—an open channel, no game, no food, and apparently no hopes from Littleton Island. We have been lured here to our destruction. If we were now the strong, active men of last autumn, we could cross Smith Sound where there is much open water ; but we are a party of twenty-four starved men, of whom two cannot walk and a half dozen cannot haul a pound. We have done all we can to help ourselves, and shall ever struggle on, but it drives me almost insane to face the future. It is not the end that affrights any one, but the road to be travelled to reach that goal. To die is easy, very easy ; it is only hard to strive, to endure, to live.”

Smith Sound in July, with its midnight sun, its placid waters and wasting ice-fields, affords to the navigator a striking contrast to that sea after sunless nights have come, when, lashed by autumn's fierce gales, it is crowded by a dense pack of moving floes constantly being cemented into a whole by the young ice, and as constantly disjointed into a thousand fields by tides and high winds. But winter cold does its work, and when the returning sun once more begins to exert its benign influence on its frozen surface, the conditions are again changed ; even if a mild winter, as in our case, leaves a mid-channel free from ice, yet the thickness of the main or new ice is such that travel, although tedious and dangerous, is yet possible. Unfortunately at this time our wasted frames had such diminished strength as rendered it impossible that we could even get the boat, covered with a winter's snow, from off our hut. Later, indeed, our efforts were unequal even to the task of clearing off the snow from the roof, when it commenced leaking through. After March 10th, I do not *now* think we could have hauled our sledge across Smith Sound, had the ice been firm, although with desperate courage and unbounded faith in our will and determination, I *then* thought it possible.

“ March 14th.—I had a long conversation to-day with Long concerning his three days' journey, and enter the following notes from his verbal report: He saw no signs of game except a fox-track, which had been made across his trail in Rice Strait during his absence. He was driven back to us by not having been able to get into his sleeping-bag during his absence. Leaving Camp Clay at 9 A.M. of the 12th, he overtook Sergeant Rice and Private Ellis hauling his sledge at the east end of Cocked Hat Island. He saw a raven, but was unable to get a shot. At 11.30 A.M., he, with Christiansen, took the sledge at the west end of Cocked Hat Island, and started direct toward Alexandra Harbor. Reached Cape Rutherford at 2 P.M., and found that its apparent end was an island about eight hundred yards distant from the main-land. This island he crossed. Two miles southeast of the cape he had passed to the southward of a very low island, which was about a mile and a half distant from the main-land. Just before reaching Cape Viele he saw a valley, which, sloping gently upward, appeared to furnish a route toward Twin Glacier Valley. He concluded to follow up this valley, as the snow along the ice-foot was getting deep. The ice to this point was all smooth, and appeared to be new ice; that is, of this year's formation. The ice in Buchanan Straits, as far as could be seen, was smooth and favorable for travelling; consisting of level floes, and being free from hummocks. Before reaching the valley above mentioned, he made camp, at 7 P.M., on the west side of the small island near Cape Rutherford. They cooked supper, and at 8 P.M. attempted to get into their sleeping-bag, which was frozen up so badly that after three hours' exertions they were unable to do more than push themselves in up to their breasts. As there was no wind they tried to rest in that condition, but were unable to get any sleep; and, being nearly frozen, about 2 A.M. of March

13th, they concluded to get up and go on, which was done without cooking anything. They reached a point near Cape Viele, where tea was made, some bacon having been eaten on the way. At 8 A.M. they started up the valley near Cape Viele, taking some hard bread, rum, spirits of ammonia, and pemmican in a knapsack, leaving their sledge, sleeping-bag, cooking apparatus, and fuel at camp. Scarcely any vegetation was to be seen in the valley, which they followed up three or four miles, until they struck the ice-cap, a regular glacier, the northern of the two which discharge via Twin Glacier Valley into Alexandra Harbor. They crossed the glacier without difficulty. The whole country around was ice-capped, there being only two small pieces of bare highland visible between the twin glaciers. They found that the ice-cap extends to the southeast as well as into Alexandra Harbor, and that evidently it unites with the glacial cap which discharges into Rosse Bay. From the highest point east of Twin Glacier Valley Long had an excellent view to the northwest, and carefully examined the country with his glasses. Bache Island terminates in low land, while to the southwest of it was a small, rocky, high island, very much resembling in its structure Cocked Hat Island. Princess Marie Bay appeared to connect with Hayes Sound. All the western end of Bache Island is low ground, rendering it difficult to say just where the land ended or the water commenced. Some distance in rear of Capes Baker and Stevens the land rose gradually, and a range of low mountains or very high upland was seen, which, however, presented to his view no particularly prominent peaks. He could see the entire west end of Alexandra Harbor, but the valleys and capes were filled with snow, and no signs of game were anywhere visible. To be certain, however, they followed the ice-cap around, and descended to the water-edge near the head of the harbor. A

large glacier terminates at the head of the harbor, and about a mile and a half from the glacier was a low island, at right angles to the glacier and nearly extending across the fiord. They climbed up the west shore of the harbor, and attempted to cross the country between Mount Carey and the mountains to the southwest. They met, however, very steep cliffs of about two thousand feet elevation, which prevented their passage. To the southwest the country was ice-capped, and offered no chances for game. After nine hours' constant travelling, Long reached a point north of Mount Carey, from whence he was able to look to the westward into Hayes Sound. From Bache Island, commencing with Cape Stevens, he counted five capes on the north side of the Sound. On the south side the land was very high, with valleys filled with snow or ice extending inland from the Sound. About twenty miles to the west high land (Schley Land) was visible, and the coast seemed to trend to the northwest. To Long it appeared as though Hayes Sound terminates and the two coasts north and south unite, but of this he could not be certain. The weather was then clear to the westward, but somewhat hazy toward Cape Stevens. While the high land to the westward appeared to thus shut in Hayes Sound, yet the distance was such that he felt no certainty about it. Owing to Christiansen being somewhat demoralized by the adverse prospects, so far from the hut and no game, he concluded to return to the bag, which was done in as direct a course as was possible. Had it not been for the timidity of his comrade, he would have pushed across Hayes Sound to Cape Baker. They reached Cape Viele at 10 P.M., having been absent fourteen hours, and having eaten only four ounces of pemmican and a few ounces of hard bread during this time. They cooked some tea, and again attempted unsuccessfully to get into their bag. After tea, as Christiansen wished to return at once to the

station, Long concluded to start in. They travelled an hour and then went into camp, and once more tried to get into their bag, but could only cover their breasts. After having been in the bag about three-fourths of an hour, Long was taken sick with cramps, and was much exhausted by the severe pain. Christiansen got out, heated a little rum, and gave it to him with some spirits of ammonia, which soon set him right. Christiansen kindly remained out of the bag, and, pulling the flap over Long so as to permit him to get some rest, made tea. After drinking it, and eating four ounces of bacon, they started, about 5 A.M., for Camp Clay; but on reaching Cocked Hat Island, about 2 P.M., were so much exhausted that they stopped and had some tea and four ounces of pemmican. They reached Camp Clay at 7.15 P.M. quite exhausted, but in no ways injured or frost-bitten.

“Both Long and Christiansen are somewhat stiff to-day, but are otherwise well. The iron endurance and great energy exhibited by these emaciated, starving men in this extraordinary journey astonishes me. Long has added to his and our laurels by extending Hayes Sound at least twenty miles beyond the farthest of our predecessors. Long’s opinion is to the effect that the western extension of Hayes Sound presents no chance of game, as the valleys of the entire southern side of it are ice-capped or filled with snow. The appearance of the country on the north side seems more favorable to game, and he thinks it possible that something might be found in the neighborhood of Cape Baker; he expresses the desire to try later a trip in that direction, with Brainard, who volunteer to replace Christiansen. Brainard, hunting to-day, brightened up the party somewhat by killing three ptarmigans, the first game since early in February, when a fox was killed. Elison, who is in wonderfully good spirits, says that Brainard has broken our evil spell. It cer-

tainly encourages us to get a little additional food at this critical season. Rice improved the fine day by crossing Bedford Pim Island into Rosse Bay, which he did in three hours. He visited a number of the grounded bergs hoping to find seal, but saw no traces of them. He then went down the island, coming out near Payer Harbor, and reached camp at 7 p.m. He saw a raven, but no other signs of game. The ice in the straits he says is very much improved, and to the northward it is closed a great deal, but there is much open water south of Cape Sabine."

"March 15th.—Had our last regular morning stew; but a small quantity of beef extract and four spoonfuls of potatoes remain. In our stew to-day we had two ounces of bread, one of bacon, a third of an ounce of potatoes, and a half ounce extract of beef to each person. Dr. Pavy says that Gardiner's finger can be called well. He has been unable to use it ever since the last of September. Brainard and Jens hunting, but neither saw game. Lieutenant Kislingbury visited the water-pool, and made us very hopeful by reporting five dovebies in winter plumage, and the tracks (three days old) of a bear followed by a fox. A fine clear day, with a temperature of -30.8° (-34.9° C.). Three ptarmigans killed by Brainard, which weigh three pounds and ten ounces. They were plucked and issued; beaks, claws, and entrails being eaten."

"March 16th.—The day remarkably fine and clear, with a temperature -34.7° (-37.1° C.). Our last "son-of-a-gun" to-day. Lieutenant Lockwood is weaker than yesterday, but he seems now to be in good mental condition. Long and Christiansen, with the kayak, went to the open water. They returned about two o'clock, Long having killed four dovebies in winter plumage; they weigh four pounds exactly after being plucked. Several other dovebies were seen and a small seal, which Christiansen fired at but unfortunately missed. The entire

party are delighted at the game, and feel much encouraged at the prospects. The ptarmigans eaten in to-night's stew were very fine.

"Brainard made an improvement on my plan of last autumn to dredge for mussels, and suggests that we try and catch shrimps. Certainly our men are full of devices, and we shall yet make a brave fight for our lives."

"March 17th.—Saint Patrick's Day. Obligated to reduce the ration to seven ounces of bread and four ounces of meat. The temperature high, being -25° (-31.7° C.) at 6 A.M. Lieutenant Kislingbury and Jens hunting; the latter killed a ptarmigan weighing twenty ounces. Lieutenant Kislingbury saw a small seal near Expectation berg, as some one had named the immense grounded floeberg near us, but got no shot. Two ounces extra bacon issued to Elison, making twenty-four ounces against eleven ounces to the others."

"March 18th.—Twenty-one years ago to-day I was promoted to be an officer in the volunteer service. Strong wind and drifting snow prevailed, so that Long could not hunt. Christiansen's feet are badly swollen; a dropsical effusion similar to that experienced by Brainard some time since. The doctor thinks it advisable that Christiansen should not be exposed to cold, and so he can no longer hunt. The trip with Long substantially broke him down, as did that of Jens with Rice—a commentary on the comparative endurance of the two races. Lynn, whose mind has appeared to be shaken ever since his terrible experience on the Isabella trip, is apparently giving up. Apart from Lockwood, Lynn, and Elison, no one is disabled, though several are very weak."

"March 19th.—Strong wind and drifting snow again prevent hunting; it is almost maddening to lose these days."

"March 20th.—Temp., -20.2° (-29° C.). Long hunting,

although the day was not good; saw two dovekies. Three owls or falcons (probably the former), flying northward, and the raven were observed to-day. Rice went out hunting shrimps, putting into practice my idea of last autumn as improved by Brainard, but he was not very successful, as he caught only a couple of ounces. Christiansen nearly disabled the Remington by putting a stick down the barrel to force out a tight shell."

" March 21st.—A storm prevents hunting. Lieutenant Kisslingbury, who has been troubled with a carbuncle on his finger, had it lanced to-day by the doctor. He fainted, and was afterward sick at the stomach. Jens is also troubled with dropsical effusion, so it is a question as to who will hunt, he or Christiansen, since both are sick and neither should go, the doctor says; I have cut the gordian knot by sending both on alternate days. A net was made in which to catch shrimps; an improvement on Rice's plan of yesterday. Gardiner was anxious to do something for the common weal, and so fixed up a rake for dredging, hoping to get some mollusks or sea-weed. It is surprising with what calmness we view death, which, strongly as we may hope, seems now inevitable. Only game can save us. We have talked over the matter very calmly and quietly, and I have always exhorted the men to die as men and not as dogs. There is little danger of these men failing in the dire extremity, for the manly fortitude and strength of the many compel respect and imitation from the few. Other than Henry's blasphemous remarks, I have heard none speak of our coming fate, other than with decency and respect. I have instanced, as a fine example of the spirit with which men should meet death, the English troop-ship, when the men, drawn up at parade-rest, went to the bottom of the sea without a murmur, while their wives and daughters filled the boats. One supreme effort is

easier far than this long-drawn-out agony, when, too, it is easier to think of death than to dare to live."

I may add that the story of the troop-ship appealed strongly to us as soldiers, and I doubt not my men would have gone to the bottom of Baffin's Bay, with the same spirit had their condition even been equally hopeless. The Birkenhead was often alluded to by us.

Lieutenant Lockwood says: "The time draws near when our group comes to an end. We look on it with equanimity, and the spirits of the party, with this prospect of a miserable death, are certainly wonderful. I am glad as each day draws to an end. It puts us nearer the end of this life—whatever that end is to be. The fuel, except the boat, ends to-morrow. Talk all the time on the subject of food."

"March 22d.—Rice tried the shrimp-net to-day, and brought in about a pint of minute shrimps. He thinks he can get a quart daily, which will be a considerable help to us. Long and Jens hunting. Ellis carried out the kayak for them. Long reports that the ice extends about three miles farther out than on the 17th. This is very encouraging for closing, but I have given up the idea of crossing, as our strength and rations would not permit such hard work now, and we must be even weaker when the straits close, if at all. I have concluded that on April 1st I shall reduce the rations to a basis which will enable us to live till May 1st."

"March 23d.—Brainard came in this evening hardly able to stand after a trip into Rosse Bay. He visited the glacier front, which he finds advances all winter, but there were no open water-pools as he hoped for. He visited many grounded bergs, but saw no signs of seals or walruses. Rice, indefatigable as ever, was out at 3 A.M. for shrimps. Unfortunately he overturned his net, and brought in only a few ounces. The nets are

set at the face of the glacier over a mile toward Cape Sabine. The overhanging face of the glacier is jammed by the main floe at high tide, but as the water falls a crack opens, which permits the nets to be set and drawn at or near low tide. The water is nearly thirty feet deep at high tide. Rice reports that there is a large bone, presumably the rib of a Greenland whale, visible at the bottom of the sea. He observed it while trying unsuccessfully to obtain sea-weed. Bender has made a fish-hook, as Connell thought he might do something with it."

Lieutenant Lockwood says: "Lieutenant Greely announced this morning that we could run along on the present ration until April 6th; and then, by cutting down to three ounces of meat per day, without bread, we could exist until about May 1st. This is most encouraging. Our present ration is so small, however, that it remains to be seen what the effect of any further reduction will be. We are hungry all the time. It is impossible to fix our thoughts for any length of time on anything but food. We have various seal-skin articles of clothing which we talk of eating."

On March 24th the entire party nearly perished by asphyxiation from the fumes of the alcohol-lamp used in cooking, as our wood was all gone except the boat, which I dreaded to touch, although it was useless except as a roof. It had been the custom to close with rags the tin can which formed the funnel through the boat, so that as much heat as possible could be retained in the hut at night. The cooks had forgotten to remove the rags, and in consequence the alcohol-lamp burned poorly. This drew attention to the fact that the rags were still in the funnel, and they were at once removed. About this time Sergeant Israel complained of nausea and dizziness. I spoke to Dr. Pavy regarding it, and he advised Israel to lie down, saying that he would be better in a few minutes. Shortly

after Biederbick, on the other side of the hut, fainted, and the doctor went to his assistance. Sergeant Israel then became unconscious, and while I was devoting my energies toward restoring him to consciousness another man became faint. Sergeant Gardiner called out, "It is the alcohol; open the door, open the door!" The door opened, every one who was able, with one or two exceptions, crawled out of the hut, some fainting by the way. On emerging from the passage-way, I saw Brainard stretched upon the snow perfectly white and apparently dead. Whisler fell down, and I went to his assistance; but, before reaching him, lost my strength and fell to the ground. Gardiner came to my assistance, and with difficulty got me on my feet, and tried to put a pair of mittens on my hands, which had already commenced freezing. Whisler also tried to assist me, but Gardiner falling to the ground, we turned our attention to him. By this time Brainard had recovered consciousness and was able to rise. Strength and consciousness returning to us, we realized that we were freezing, the temperature being about -25° (-32° C.). It was remarked afterward by all the men who got out of the hut, that every one attempted to assist his neighbor except Henry, who held himself aloof, evidently caring for no one but himself. Those who had been more or less affected within the hut fared better, escaping as they did the frost-bites which fell to the lot of those who ventured into the open air. Doctor Payv and one or two others were not affected, but Biederbick and Israel were very near unto death. Several of the men were sharply frost-bitten; Sergeant Brainard suffering the most of any one, except myself. My hands were frozen so severely above the second joints that a week passed before I was able to even feed myself, and nearly two weeks before I could use my fingers without great suffering. A half gill of rum and two

and a half ounces of extra bread were issued to each man to replenish our strength after such exposure and experiences, and Brainard, notwithstanding badly frozen fingers, went after and killed a white fox weighing over five pounds. After order was restored, and the breakfast cooked, it was found that a piece of bacon had been stolen. Curses loud and deep were heaped upon the man who would be base enough to steal the food from his comrades, who were striving against death in another form than by starvation. A few hours afterward I gathered in conversation that suspicion rested upon Henry, and later learned that "Our little man" (as we called Eskimo Jens) had seen him take the bacon and conceal it within his shirt. In the meantime, those who suspected Henry kept watch on him. Just before dinner he complained of nausea. The meat for dinner was divided, and Henry, in my hearing, said, on taking his portion, "I'll put this away." In a minute or two afterward, becoming sicker, he vomited. Frederick found, when it was emptied, that the can contained a considerable quantity of undigested and scarcely masticated bacon.

A general investigation of Henry's conduct was had on the 25th, which clearly established his guilt, not only of the bacon, but that he took a double allowance of rum after the theft. It further transpired that he had been a thief at Conger, and was more than suspected of tampering with our provisions the preceding autumn. Commencing with his own friends and sleeping companions, each man in turn pronounced him guilty. There was much suppressed talk of proceeding to violence, but I simply remarked that it was a military command, and that I would take extreme measures when needful. Since I had spared an officer these many months, on grounds of indispensable service, I was unwilling to deal otherwise with a private. I relieved Henry from any duty: and, the party being too weak

to put him under confinement, I prohibited him from leaving his sleeping-bag except under the supervision of one of his comrades. Two days later it was found that ten ounces of English chocolate reserved for Elison had been stolen. All circumstances pointed to the belief that Henry had stolen it before the 24th, but nothing certain could be proved.

Brainard, on the 25th, says of the returning hunters: "Christiansen came in greatly exhausted and almost unconscious, having been supported and half carried by Long from Cape Sabine. Had it not been for Long's timely aid, he must have perished from the cold. The shrimps are now mixed with our stews, and are quite palatable. The minute animals have opened up to us a new avenue of escape. Snow has been removed from the boat and holes cut through. For the first time since we have occupied the hut, a meal was cooked without artificial light."

For the first time in five months a ray of outside light entered our wretched hut, and recalled home, and light, and warmth, inspiring all with renewed hope and vigor. Lieutenant Lockwood says: "For several hours we got along without candles. We are all confident now of pulling through and the spirits of the party are excellent." I recall vividly the effect it had on me as the first rays of entering sunlight disclosed to my view the scene of utter squalor and misery in all its wretched details. For a moment the ennui and pain, the cold and hunger that had abided, the physical weakness and mental irritation which had come, the heart-sickness resulting from blasted and deferred hopes, and the impotent and maddening rage at our utter helplessness, rose up before me; and, though not an expressive man, I turned and said to my astronomer in the bag with me, "How have we ever passed through this hell on earth and kept our reason?" But with the bright rays of sunlight came

instantly other thoughts, of the patient courage, the enduring fortitude, the unwavering loyalty, the great self-denial these men had shown through almost endless months, and I added, "I shall ever think better of mankind for this ordeal."

On the 26th Biederbick was relieved as cook, much against his will, owing to anemia, induced by overwork and of course lack of food. A violent storm that day quite exhausted Brainard and Rice, who were hunting and shrimping. Rice, however, brought in some shrimps, and also a few crustaceans, which I ordered saved as a scientific collection, and issued a gill of alcohol to preserve them. My idea ever was to cultivate the thought of something else besides our wretchedness, and so through all the terrible winter regular observations of the barometer, thermometer, wind, and weather were made and recorded, and now near the end our collection slowly grew.

The violent storm of the night ceased on March 27th, my fortieth birthday. The party were all very kind in their expression of good wishes for my future. I did not care, in our distress, to take the usual half gill of rum to celebrate. The day was celebrated notwithstanding. Rice made four trips, and succeeded in getting twelve pounds of shrimps. The great event of the day, however, was Long's success in obtaining game. He and Jens went out beyond the grounded bergs, and Long killed thirty-eight dovekies, of which Jens secured thirty-three by means of the kayak. Long had for several months promised to obtain something in the way of food as a birthday present for me, and was exceedingly gratified that he had been successful. I cannot say how grateful we were for his success, nor express how great was the enthusiasm and hopefulness excited among us starving men. Brainard says: "Long was the hero of the hour; cheer after cheer was given the hunters, and general good feeling prevailed."

Schneider was doing well, and trying to redeem himself in the eyes of his comrades. Salor, on hearing of the dovekies, carried out the kayak for Jens, and Lieutenant Kislingbury and Connell took out ammunition when the first supply failed. The day was calm, clear, and fine, with a temperature of -8° (-22.2° C.). Lockwood was somewhat better, but Christiansen remained on the sick-list, and Ellis complained of sickness, which the doctor thought arose from his surreptitiously eating bits of rancid stearine which were covered with verdigris. Henry, after the birds came, begged that he might be allowed to do duty, saying that I would kill him by treating him so harshly.

On March 28th Rice was very successful, and got twenty-seven pounds of shrimps, while Long secured fourteen dovekies and Christiansen shot a ptarmigan, so that the party now looked forward with high hopes to the future. Brainard went to Sabine hunting, and his journal says: "I found (around Payer Harbor) many traces of ancient Eskimo encampments, and the remains of a wooden sledge with bone shoes. They were carefully placed together in a conspicuous position. The evening readings, which have been so much of a gratification to us in the past, are discontinued, owing to the inclination of some to sleep rather than hear them. Any vessel could steam up Smith Sound without difficulty or hindrance. The water washes against Cape Isabella, and probably extends to the Greenland coast."

Another ptarmigan was shot on the 29th, on which day Brainard notes Elison's inquiring if the doctor could not do something for his feet, which itched uncomfortably, unconscious that they had been gone since early January.

CHAPTER XLII.

THE BEGINNING OF THE END.

APRIL opened favorably, for Long killed eleven dovekies and two ptarmigans, and saw a seal and walrus. On the 3d we had yet remaining five pounds of meat, three of bread, and nearly two of stearine to each man. Riee, too, was bringing in from twenty to thirty pounds of shrimps daily, and reported that sea-weed, or kelp, was visible, and might be reached, he thought, at the spring tides. Our first really depressing day came with April 5th. The night before Christiansen, one of the Eskimos, had been somewhat delirious; but in early morning he grew worse, and at nine o'clock died. During the previous week considerable extra food had been issued him in the hope of saving him. His body was carefully examined by Dr. Pavy and Steward Biederbick. The doctor reported that a few ill-defined signs of scurvy were visible, but that death resulted from the action of water on the heart induced by insufficient nutrition. We dreaded to use or hear the word starvation, but that was the plain meaning of it. His death could not fail to have a very injurious effect on the weak and despondent.

Lieutenant Lockwood says of him: "He was a good man, and I felt a great affection for him. He certainly worked hard in my service, and never spared himself on any sledge trip. His death makes me feel very sorrowful." He also says: "I have felt a great difficulty for some time past in eating shrimp stews, and have had to force them down to some extent. Fort-

unately Jens and I are the only ones affected in this way. I find myself still weakly ; to-morrow morning I may be cut off."

I had recommenced my diary, discontinued owing to badly frozen hands, which says: "The spirits of the party are undoubtedly affected by Christiansen's death. Lynn is in a very bad condition. Besides him, only Lieutenant Lockwood and Jewell are in immediate danger. Preparations have gone steadily forward for Rice's trip, which I look upon as inevitable."

On Sunday, April 6th, Lynn became unconscious at 1 P.M., and died at 7. He asked for water just before dying; we had none to give. It was noticeable, in after cases, that almost invariably from six to twelve hours before consciousness ceased thirst began, and a request for water was repeatedly made. Lynn's death affected us all deeply. He was a strong, vigorous man, of even temper, simple in his manners and tastes, a kind comrade, a faithful soldier, whom all liked and respected. In three years' service I had but one occasion to criticise his conduct. It had long been evident to us that his dreadful experience on the Isabella trip had shaken him terribly, breaking him physically and weakening him mentally. During the winter he had repeated almost daily, in season and out of season, the motto of Kentucky, "United we stand, divided we fall." I had strenuously inculcated that idea, and I doubt not that its pathetic reiteration by Lynn most impressively stamped it on the mind of even the dullest, to the advantage of discipline and unity.

I issued four extra ounces of meat to Lieutenant Lockwood, and a half gill of diluted alcohol to each one of the party, feeling it necessary to counteract the depression of spirits arising from Lynn's death. Lieutenant Lockwood says of Lynn: "His death was a good deal of a surprise to me, and has cast a gloom on the party during the day; he was much liked and highly spoken of by all. The burial service was read here at

the hut by Lieutenant Greely, and then the body taken to the cemetery on the sledge." Of himself, he says: "I find myself almost as weak as ever again. I have not been out to-day or yesterday. I took a little exercise in the hut to-day. Had a few ounces of dovekies issued to me yesterday and this morning in addition to the regular fare."

Near midnight of April 6th, Sergeant Rice and Private Frederick started southward to Baird Inlet. They went to attempt the recovery of the hundred pounds of English beef which had been abandoned in November, 1883. Such abandonment, it will be remembered, was necessary to save the life of Sergeant Ellison, then dangerously frost-bitten. The journey had been proposed by the two men about the middle of March, but I had persistently objected to it, foreseeing the great chances of a fatal result. The men, however, represented to me the desperate straits to which we were reduced, the value of the meat if obtained, their confidence in their ability to find the cache, and the certainty of their strength being sufficient for the journey. They asked but one favor, that they be permitted to make the attempt on the same ration as that issued to the general party—four ounces of meat and four ounces of bread daily. In such case they said no injury could result to the party in the event of failure. The provisions might be increased, they could not be diminished.

At first I refused to countenance the attempt, but as the days passed and the strength of the party waned, and death to some seemed imminent, I felt the necessity of yielding. I accordingly decided on the trip, and fixed April 1st as the day of departure, provided the weather was good and our prospects not improved. The success of our hunters, Long and Jens, in obtaining birds, on March 27th, awakened hopes that the journey would not be necessary, and the departure was consequently

postponed. Early April brought no relief, and game again failed. Christiansen's death decided me. I no longer hesitated, but gave the final orders. The orders were verbal. Detailed instructions to such men on such an errand would have been unwise, if not culpable. Rice was regarded naturally as the leader of the forlorn hope, and to him the orders were given



Sergeant George W. Rice, our Photographer.

simply to go and do the best he could. I, however, cautioned him particularly against over-exertion, knowing his great ambition and fearing for his strength. He had not been well on Thursday, and I had asked him to be fair and candid, so that I might not send a sick and unfit man on so trying and dangerous a journey. I told him that Sergeant Brainard, ever willing and anxious to serve us all, had expressed more than willingness to

go in his stead. He on Sunday noon came into my sleeping-bag, and had a long talk over the situation. Rice declared that he had recovered entirely from his indisposition, insisted that he was as strong as Brainard, and that the duty should come to him, not only as the originator, but on account of his knowledge of the locality and his familiarity with the appearance of the ice as gained from two trips to Isabella.

In order to avoid the long detour through Rice Strait, he decided to go direct across Bedford Pim Island.

The sledge, loaded in the morning, was hauled during the day to the crest of the island by Lieutenant Kislingbury, Brainard, Ellis, and Whisler. They returned about 6 P.M., thoroughly exhausted by their labors. Whisler was much bruised from frequent falls on the glacier by which they had descended.

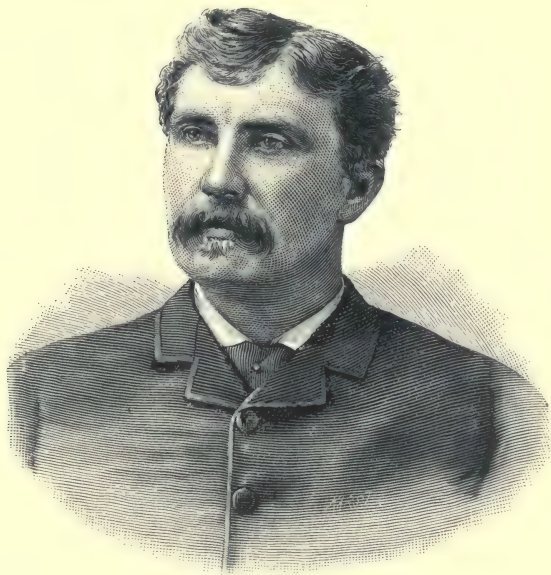
After a final consultation with me, Rice, in default of other sleeping-place, his bag being with the sledge, crept in with his comrade, Lynn, who had just died. He slept for a short time with the dead, unconscious that in a few hours he, too, would pass away.

When Rice and Frederick started, our hearts were almost too full for utterance, but we managed to send after them a feeble cheer, that they might know our prayers and Godspeed were with them on their perilous journey. Their outfit, though our best, was simple: A rough, common sledge (the one brought back by the rescuing squadron), a two-man sleeping-bag, a rifle, an axe, an alcohol-lamp, and a small cooking-pot. No tent was available; nor had there been, would their enfeebled condition have permitted them to haul it. For food, very much against their inclination, I increased the daily ration to six ounces of bread and six of pemmican, with a small allowance of tea. A cooking ration of five ounces daily of alcohol

was granted, and for medicinal purposes, if needed, a small quantity of rum and spirits of ammonia and a few pills were added.

The details of the journey, told us in simple, touching words by Frederick on his return, were substantially as follows :

The temperature was -8 (-22.2° C.) when they started. On



Sergeant Julius R. Frederick.

[From a Photograph.]

reaching the summit of the island, where the sledge awaited them, a heavy gale was experienced. The descent into Rosse Bay was made through much deep snow, and the enfeebled men frequently pitched headlong into a drift, from which they always emerged breathless and exhausted. At last the ice in the bay was reached ; but, contrary to their hopes, the wind increased and drifting snow filled the air. Struggling on as long

as they could, they were finally compelled, about 8 A.M. of the 7th, to camp.

The high wind and blinding snow rendered the lighting of the lamp for tea impossible, and so, without drink of any kind, they stretched their sleeping-bag on the ice, and, taking a few ounces of frozen pemmican, crawled into it for rest. They were confined to the bag for twenty-two hours by a violent storm, which buried them completely with snow. About 6 A.M. of the 8th they got out of their bag, but were too cold to cook until they had travelled an hour. A warm meal, with tea, refreshed them very much, as they had been nearly thirty-six hours without drink. About 7 P.M. that evening dark and blustering weather drove them to camp. Their sledge was drawn up between a large iceberg and the face of Alfred Newton glacier. The morning of April 9th broke calm and clear, and an hour's travel brought them to our old camp at Eskimo Point. Being within six miles of the place where the meat had been cached, they decided to drop their sleeping-bag and a portion of their rations, expecting, with their lightened sledge, to reach the meat and return in one march.

Frequently open pools of water around the grounded icebergs caused long detours. At times the tidal overflow wet their feet, and their foot-gear froze solid the instant they touched dry ice. To add to their misfortunes, about 11 A.M. a strong northwest gale sprang up, with drifting snow, which tended to chill and exhaust them. In a short time they were unable to see any considerable distance. Struggling on, by 3 P.M. they had reached the place where the meat had been abandoned; but, notwithstanding a very careful and extended search, they were unable to find any traces of it. No signs of their old sledge-tracks could be seen, and from the appearance of the place they inclined to the conclusion that the ice had

broken up and moved out since their last trip the preceding autumn. Frederick at this juncture proposed that they return to their sleeping-bag, and resume the search on the morrow. Rice favored remaining, hoping it would soon clear and that the meat would be found. About 4 p.m. Frederick noticed indications of weakness in Rice, and reminded him of their mutual agreement to give timely warning of approaching exhaustion so as to avert disaster. Rice said that if they travelled a little slowly he would soon be rested, but in a short time he showed such signs of exhaustion that Frederick called a halt, and gave him a quantity of spirits of ammonia in rum until some tea could be cooked. After warm food and drink, Frederick in vain urged him to start to avoid freezing. His condition had now become alarming. He was too weak to stand up, and his mind continually reverted to home, relatives, and friends, and to the pleasures of the table in which he intended to indulge on his return. At the same time he appeared to realize his critical condition, and gave detailed instructions regarding his manuscripts and personal effects.

In the meantime Frederick did all possible for him. Although a driving storm of wind and snow, with a temperature of 2° (-16.7° C.), as shown by our camp records, prevailed, he stripped himself of his *temiak* (jumper), in which to wrap poor Rice's feet. In his shirt-sleeves, sitting on the sledge, he held his dying comrade in his arms until a quarter of eight, when Rice passed away. Save the last half hour, this time was enlivened, as far as it could be, by cheerful jocoseness and lively remarks, in which Rice and Frederick had always indulged. It must not be thought a mockery, for death had been looked so long in the face that he had no terror for most of the party, and killing the present by distracting the mind had become a second nature to many of us. Frederick's condition may be



THE DEATH OF RICE—HAIRD INLET, APRIL, 1884.

more readily imagined than described. Starved by slow degrees for months, weakened by his severe and exhausting labors, chilled nearly to numbness, he was alone on an extended ice-field with his dead comrade. His sleeping-bag was miles from him, and to reach it he must struggle against a cutting blast filled with drifting snow. Such a march might well daunt the strong and hearty, but to that weak, starving man it must have seemed torture and destruction. For a moment, he said, he thought he must lie down and die; it was the easiest thing to do. But then came to him the recollection of his starving comrades, who awaited his return with eagerness and hope. If he came not, some of those behind, he well knew, would venture forth and risk their lives to learn tidings or bring succor. Thus thinking he turned away from the dead to return to us, the living.

He reached Eskimo Point and his sleeping-bag too weak to open it until he had laid down a while and revived himself by a mixture of ammonia and rum. Recovering strength and vitality by sleep and a little food, he was unwilling to return to us until he had buried Rice, and to cover his comrade with snow and ice he walked ten or twelve miles over the floe.

Frederick's return to us was a marvel of forethought, energy, and endurance. Dragging his sledge as far each march as his feebleness would permit, he took a little food, and getting into his bag drank a spoonful of ammonia and rum, which enabled him to sleep. As soon as he awoke, benumbed and stiff, he immediately got out of his bag, travelled on until he was thoroughly warmed up, then prepared tea and food, and marched on as far as possible. In this way he managed to bring back to us everything hauled out; and, astonishing to say, he turned in Rice's rations, having done this work on the food allotted.

The mourning over Rice's death was deep and prolonged,

for it was felt that he had died for us, as his strength, if not wasted in that journey, would undoubtedly have brought him through to the end. He was a clever, cultivated, and amiable man, who had endeared himself to his comrades, and distinguished himself in the field and during the retreat. His willingness to ever venture his life for his comrades was evidenced by his extraordinary trips to Isabella, Sabine, toward Littleton Island, and, last, by this fateful journey.

One man broke down completely, giving way to sobs and groans which were most dismal to our ears. The party with one consent berated him soundly for this exhibition of feeling, glad, I thought then and think now, of some action which would divert attention from themselves and prevent others from seeing how keenly this death affected each one of us.

The condition of affairs had changed much during Frederick's absence. Lieutenant Lockwood's condition after Christiansen's death alarmed me very much, and on April 6th I commenced issuing him extra food—four ounces daily of raw dovekie, all and really more than we could well spare. He seemed better on the 7th, but Lynn's death affected him very seriously, and he said that he wished it was over with him. The last words he wrote were on that day: "Jewell is much weaker to-day." On the 8th he fainted, and his mind wandered much during the evening, but never unpleasantly so. He became unconscious at 4 A.M. of the 9th, and died twelve hours later, calmly and peacefully, without suffering, as passed away all of our party.

Lieutenant Lockwood was a gallant officer, a brave, true, and loyal man. Christian charity, manliness, and gentleness were the salient points of his character; of a modest and retiring nature, he did not make friends quickly, but his personal qualities invariably commanded respect. Slow to form or advance an opinion, he decided wisely, and bent his best energies

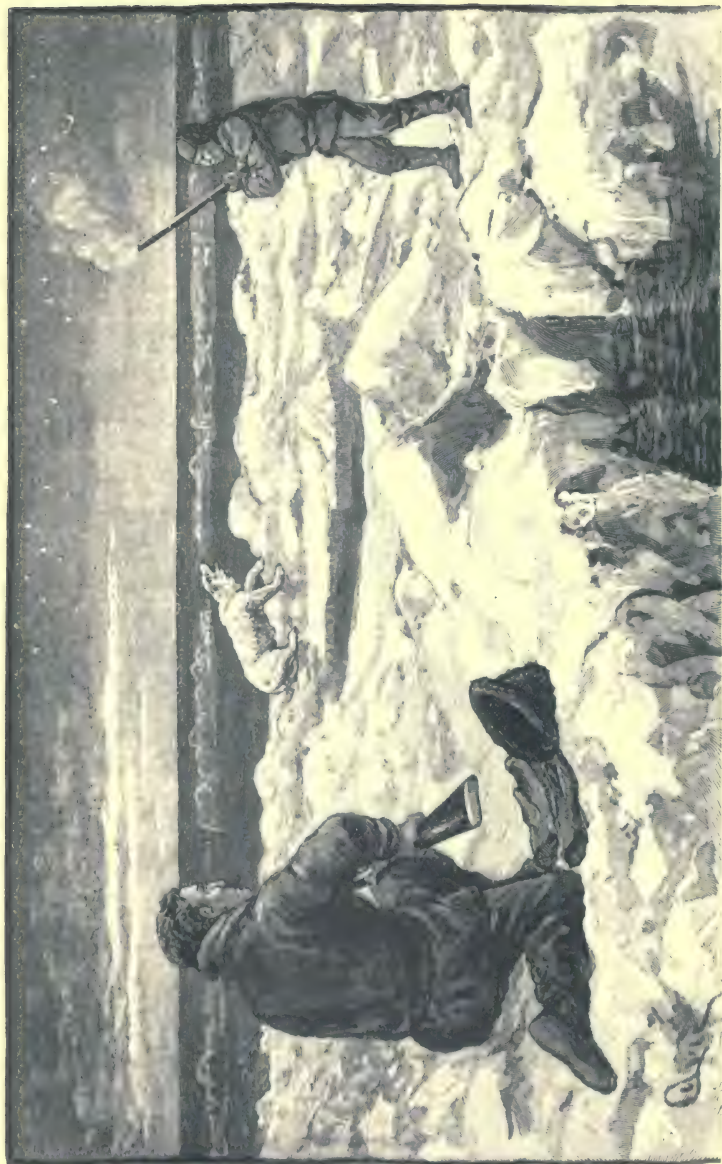
to the accomplishment of his duties ; and to those qualities, and not to good fortune, must be attributed his great successes. He always did his best, and that best will give him a name in Arctic history as long as courage, perseverance, and success shall seem worthy of man's praise and ambition.

On Lieutenant Lockwood's death I felt it obligatory to order Lieutenant Kislingbury to duty with the expedition ; a step which had not been taken, first, because Lieutenant Kislingbury had never requested it, and, secondly, in case of my death his return would have thrown the command on him to the detriment of Lieutenant Lockwood, who had labored hard and successfully on all occasions. I complimented Lieutenant Kislingbury highly on his labors the preceding autumn, when he had spared neither strength nor exposure to collect our scattered supplies, and had overworked and seriously strained himself.

Jewell failed after Lockwood's death, and, despite extra food, four ounces daily, died on the 12th, becoming unconscious in my arms. I fed him for several days before his death, and labored assiduously to inspire him with new courage and vigor. He was an excellent man, and had been a most efficient and conscientious observer. He had also performed extraordinary field service considering his slight physique.

On Easter Sunday we heard on our roof a snow-bird chirping loudly—the first harbinger of spring. All noise stopped as by magic, and no word was said until the little bird passed. His coming on that Sabbath morn was thought a good omen, and did much to cheer us through the day. Frederick heard a snow-bird the same day in Rice Strait.

On Rice's departure Salor had attempted the work of catching shrimps, but, breaking down, had been relieved by Brainard, who was very successful, bringing in from twenty to thirty pounds daily, thus enabling us, with a few ounces of meat, to



LONG AND JESS KILLING THE BEAR—APRIL 11, 1884

keep body and soul together. On the 11th Brainard fell breathless in the passage-way, calling out "A bear, a bear!"

He had seen one coming up the ice-foot, and, being unarmed, returned as rapidly as his feebleness would permit to the hut. Lieutenant Kislingbury, Long, and Jens immediately started in pursuit, but Kislingbury returned exhausted after going some two hundred yards. Long and Jens proceeded cautiously; but the bear, catching sight of them, turned and made for the open water nearly two miles distant. The hunters wisely divided, one travelling a little south and the other a little north of the route taken by the bear. The rough ice favored them, and as the animal stopped occasionally they got within rifle-shot before it reached the water. Both fired within a few seconds of each other from a distance of two hundred and fifty yards. Jens, confident of himself, fired first, with gloved hands, striking the bear in the fore-paw. Long, appreciating the critical situation, as the bear was within a dozen yards of the open sea, took time to unglove his hand and uncover his head so as to render his shot certain. Ten seconds later he put a ball through the animal's head, but, to insure his death, both men fired again after he fell. The bear proved to be a young one, weighing about four hundred pounds dressed. This game seemed to insure our future. Jens received an allowance of rum and tobacco, while as a reward for Long's coolness and skill he was conditionally promoted to be sergeant.*

The day following Long shot a small seal (*Phoca hispida*) weighing sixty pounds, which Jens secured with his kayak, and the latter hunter saw a white whale.

* Long, with Frederick and Brainard, were assigned by me to the Signal Corps, subject to the approval of the Secretary of War. It not seeming proper for the Secretary to sanction my orders, as of that date, the men were later transferred on my formal request approved by the Chief Signal Officer.

On April 13th I increased the ration of the party to a pound of meat daily, which with the shrimps improved us generally; eight ounces extra meat daily were also issued to Elison and to the hunters, Long, Jens, and Brainard.

On April 14th my journal says: "Lieutenant Kisingbury shows very decided mental derangement, and the doctor informs me that my heart is in a very dangerous condition; four ounces extra pemmican and two ounces of bread issued to me."

I had been previously urged by a number of the party to issue myself extra allowances, such as had been granted to various other members of the party when the occasion seemed to demand it, but I had not been willing to do so. The death of Lieutenant Lockwood and the mental incapacity of Lieutenant Kisingbury materially changed the condition of affairs when my death seemed imminent. If I should die, Sergeant Brainard would be my legal successor, as Dr. Pavy, who had refused to renew his contract the preceding July, became a civilian the moment he was relieved from arrest; but he was not a man to accept such a status quietly, and his misconduct was still more evident as time passed. I therefore wrote a letter transferring the command in such case to Sergeant Brainard.

My journal, April 15th, says:

"Biederbick made oath to-day about the truthfulness of his statements charging Dr. Pavy with taking Elison's bread, last autumn, and appropriating to his own use four cans of extract of beef.

"Lieutenant Kisingbury is now occupying the mattress by the side of Biederbick, since it was made vacant by Lieutenant Lockwood's death. His mind is considerably affected, and he talks at times like an infant. He frequently asserts his intention of going out and doing all kinds of work, but he is in such physical condition that he can scarcely walk; and in con-

sequence I have forbidden him to attempt labor of any kind, without positive instructions from me. In his present state any tax on his physical strength would be at once fatal. Ellis is somewhat better, but is very weak-minded. Gardiner is ailing again, and I was obliged to give him a half gill extra of rum to-day. The doctor says that he will be the next one to die."

"April 16th.—Brainard made two trips for shrimps to-day, and got forty pounds. He was entirely exhausted on his return from the second trip. His devotion to the welfare of the party is astonishing. Felt obliged to relieve Ralston to-day as cook, as some of the party are satisfied that he has not fairly divided the food. This is the first time there has been any complaint on that score in our mess. Six ounces extra of food were issued me to-day. Israel is to have eight ounces extra meat for the present."

"April 18th.—Long unable to hunt owing to continued bad weather. The doctor made a detailed report of the health of the party to-day. He says that the following are in a very bad way: Lieutenant Kislingbury, Israel, Salor, Biederbick, Gardiner, and Connell, and that Whisler is quite weak. He thinks that I am improving very slowly, and in consequence of this report no extra allowance of food was issued me."

"April 19th.—Long detected Dr. Pavy this morning drinking part of Schneider's allowance of rum. The doctor to-day complained very bitterly to me of Elison's ingratitude to him for the kindness and attention he has shown him. I cannot blame Elison for giving vent occasionally to his feelings, as he has long realized the part the doctor has played toward him. Biederbick and Ellis were much worse to-day, being unable to eat the shrimps. It worries me a great deal, for if one cannot eat them he must certainly die soon. We have a large quantity of shrimps on hand, and this evening I gave the party the

option of eating as many as they could cold. No one was able to manage more than a few ounces."

" April 20th. — Israel had the last eight ounces of extra meat this morning, and no extras are now issued, except to Ellison and the hunters. The doctor says that no increase can be allowed on his recommendation, unless it is given to Lieutenant Kisingbury, Ellis, Biederbick, Gardiner, and Israel. It is impossible to give extra food to so many, and so I give it to none. As no game has been obtained this week, I ordered that the ration to-morrow be reduced from one pound to ten ounces."

" April 22d. — Dr. Pavy and Lieutenant Kisingbury recommended me to-day to increase the daily allowance of meat to one pound. That would mean that our entire stock of meat would give out on May 7th. I told them that I could not consent to their recommendation, but finally agreed to some change, and ordered an increase to twelve ounces daily to begin on the 24th. My heart troubles me, and my end seems near. I gave to-day detailed instructions to Brainard as to my wishes regarding my effects, and the course which is to be pursued in case of my death. The letter remains in writing that he shall assume command in case of my perishing, as Lieutenant Kisingbury is unable either mentally or physically to do so. This evening Schneider broke down morally, if I may use the word, and refused to obey my orders to prepare supper. The doctor reported him well, yet Schneider said he could not do it; in consequence of his refusal, I left my bag and took his place as cook for the other mess, despite the entreaties and remonstrances of the enlisted men of the party. I said, however, that when affairs came to such a state that the commanding officer of a military party could not enforce his orders, it became incumbent upon him to perform the neglected duties himself, and not allow his inability to compel obedience to

interfere to the detriment of others. Jens, however, came forward and attended to the cooking and serving out of the tea. Schneider seemed to be in a better frame of mind after eating his supper. Long had an idea of going to Rice Strait to-morrow, and I at one time so decided ; but finally, on Frederick's representations as to the distance, state of travel, etc., decided to give the hunting-ground toward Sabine further trial until next Monday. Israel had a wretched afternoon, suffering much from weakness and pain. The party generally are in very poor spirits."

"April 23d.—Schneider cooking again. I told him yesterday that if he did not cook the breakfast he could have none ; that if he could not work here he could not eat here. I pity the man's condition, but deem it necessary that he should cook. I plead with him as a man, as a soldier, and as a German, but for a long time in vain. Bender and Henry to-day tore out the inside of the boat, and Ralston carried out six tubs of ice which had formed on the inside of the boat during the winter. Ralston's toe is in a very bad condition, but yet he is willing to do what he can. We used the last of the stearine for cooking this evening, and begin on the boat in the morning. We have yet seven gallons of alcohol, but I think it better to use it as food to eke out our remaining rations, of which we have about three hundred and thirty pounds. Our chances are still fair of getting through, but more good men may yet fall before plenty and safety come to us. Biederbick is a little better, and so are Kislingbury, Whisler, Bender, Connell, and Salor. Brainard and Elison are exceedingly well, and Dr. Pavy manages to hold his own. The old stove has burned out, and Bender made a new one to-day. The teapot unfortunately upset this morning, and consequently there was a short allowance of that beverage. Ralston, by my orders, commenced feeding

Elison this morning, as Dr. Pavy requested to be relieved from it; giving, as a reason, the effect of the smoke upon his eyes. Elison reported to me this morning that Dr. Pavy, while feeding him last evening, stole part of his bacon, taking and dropping pieces into the sleeping-bag. He requested me to make a note of this fact. Ralston spilled his stew this morning, as did Schneider his tea; but others contributed to replace that which was lost. It is gratifying to note that when any one has lost their food or drink by accident, that some of the party have invariably contributed their mite to replace it. Schneider cleared the snow from the top of the boat this morning, which improved the condition of things by admitting the light; and, as I hope, partly stopping the fearful drip from the roof upon us, which commenced this morning during the cooking. The doctor thinks an increase needed for Israel and Gardiner, and I have ordered four ounces of meat for each, commencing tomorrow. Ellis is better; I am in about the same condition. My heart gives me some anxiety. The doctor to-day promised me, on his word of honor, that he would advise me of any pressing danger in my case several days in advance, so that I can arrange matters for the future of the party. This morning, in a very general way, I impressed upon the men the importance of pluck and unity in case anything should happen to me, and that they should not lose heart in any event. I told Israel and Elison what I wanted done with my papers, so that three are now advised regarding my effects and ideas in case anything sudden does occur to me. I deem such measures necessary precautions. On Dr. Pavy's recommendation, and in a measure owing to his statement that remarks have been made by some of the men regarding the extra eight ounces of meat given Brainard for shrimp-hunting, I have decided to try Dr. Pavy's plan, and do the work without any extra allowance and through

the strongest of the party. Under this plan Dr. Pavy goes to-morrow early to set the shrimp-net. Long and Jens hunting, but had no success and saw no game."

"April 24th.—I called Dr. Pavy at 4 A.M., and he went down to set the shrimp-nets. Sergeant Brainard went at 8 A.M. to draw the nets, and found only about four ounces; the doctor had arranged everything in such an ingenious way that the shrimps could not get into the bags. He admitted afterward that he was thinking of something else at the time. I had a terrible attack of illness this morning, losing much blood and experiencing great pain, with resulting physical weakness. Was obliged to receive four ounces extra pemmican. A number of the party, speaking of the issue, said that they had long urged on Sergeant Brainard the importance of issuing regularly to me an extra amount. I told them I could not take it except in case of extreme sickness. Bender relieved Schneider as cook, so that the latter could help Brainard. Schneider went down this afternoon and made a draw of about ten pounds of shrimps, but lost two pounds by a fall; Brainard went later and got twelve pounds; Schneider is to go in the morning. Dr. Pavy ordered alcohol issued this morning to Long and Jens while I was out of the hut, a dangerous and unwarranted assumption of authority on his part. I countermanded this order, as he had been trying to obtain this issue by request, and I had three times refused it on the ground, which has been borne out by our past experience, that the issue of alcohol *in the morning* is not the proper thing, especially to men who are hunting for our lives. Long was later given half a gill by the doctor's prescription, on account of sickness. Four ounces of extra meat were issued to Israel and Gardiner."

"April 25th.—Took a half grain of chloride of mercury; am suffering terribly yet. The doctor reports the party as in

about the same condition as yesterday. The four ounces extra meat for Gardiner and myself continues. The eight ounces of meat for the shrimp-hunters begins again to-morrow. The doctor unites in recommending it, admitting that his plan of doing the work is a complete failure. Schneider was down at 2 P.M. and got ten pounds, but returned broken down physically. He left the nets so suspended that Brainard caught only four pounds in a visit later. As a result of this change of plan we have probably lost from thirty to forty pounds of shrimps, have broken down Schneider, and saved only two ounces of meat to each man. Brainard was fortunate enough to shoot two ptarmigans—the first birds for many a day. Lieutenant Kislingbury recommended the successive issue of bacon, pemmican, and seal on successive days; but later said he desired to do exactly as I wished in the matter. Commenced this morning, in deference to Dr. Pavy's reiterated medical opinion, to issue half a gill of diluted alcohol to the hunters, although I do not think it best myself. It is given before breakfast instead of after. Had a two-pot shrimp stew this morning. Storm last night, which continued this morning and prevented hunting."

"April 26th.—A bad day for hunting; Long saw but one seal. The party generally are in poor spirits. Brainard was too much run down by previous work to enable him to go for shrimps again this afternoon, and his trip was taken by Frederick, who got about seven pounds. Brainard is working far too hard, and if he should break down we certainly would be in a very bad way. Am taking a grain of mild chloride of mercury a day. Suffered much pain, and in consequence am depressed in spirits and physically very weak. My bowels seem to have completely lost their power. Connell is similarly troubled.

"Jens fired at an oosuk (*Phoca barbata*) at very short range (some forty yards) from behind the screen on the ice and missed

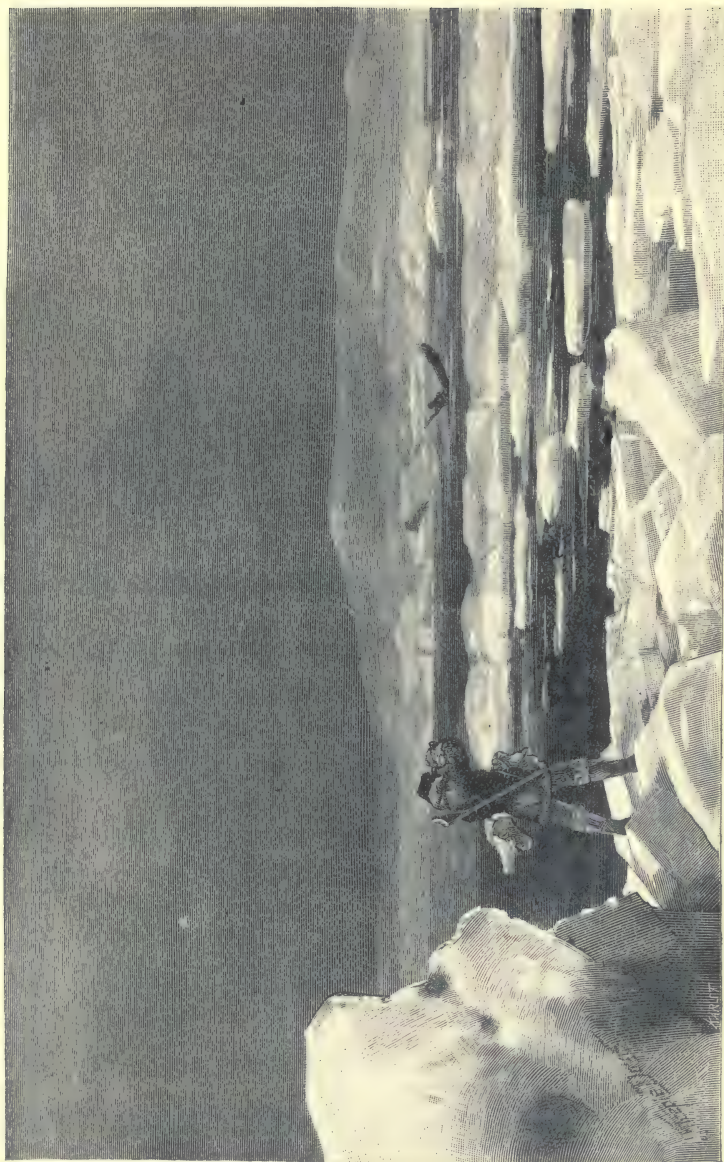
him. This morning I ordered four ounces extra pemmican for the hunters. Later Dr. Pavy submitted two written reports, dated the 25th and 27th. On the 25th he recommended that Brainard have only four ounces of meat instead of eight, which is in direct contradiction to his verbal recommendation. To-day he recommends a general increase of one ounce, which I have refused; but have decided to alternately issue American and English pemmican and bacon, but to save fuel have cut off one of the morning pots of stew. By this arrangement we have in the morning, cold, four ounces of bacon or pemmican, and, hot, one ounce of blubber and one ounce of meat, with shrimps; and in the evening six ounces of meat, with shrimps, but no tallow. Private Henry * took advantage of my illness and of others being down in their bags this morning to mix the "moonshine," and drank extra alcohol to such an extent as to become helplessly drunk. His condition was discovered by Lieutenant Kislisbury, who was next to him. The disgust of every one at such baseness is excessive. Yesterday Long saw about a dozen white whales, which were travelling from the north; they unfortunately did not come within shooting distance."

"April 28th.—Succeeded in cheering up Jens to-day. He has been very gloomy and despondent over his late misfortune in missing the seal. Everything has been done by the members of the party to encourage him, but it is evident he is losing his grip; however, he went out with Long in very good spirits.

* I should have preferred throughout this work to have omitted names in each case, when noting thefts of food and other lapses from good behavior at Sabine, believing even at that time, and being much more impressed with it now, that rigorous judgment should not be meted out to men so hardly situated. Such a course, however, was rendered impossible by the publicity given to various diaries, and the exaggerated stories growing out of them, shortly after the return of the expedition.

Connell and Biederbick have improved very much. Israel received four ounces extra meat, and Gardiner also; that of the latter goes to Biederbick to-morrow, but Israel's continues.

“ April 29th.—A fatal day for us. Breakfast at 5 A.M., instead of 6, for accommodation of the hunters. Jens and Long got away at 6.45 A.M. in excellent spirits. Jens appeared to be in particularly good humor: and for the first time in many weeks came and shook hands with me before he left, laughing pleasantly during the while. At 2.30 P.M. Long returned, and reported that Jens was drowned at 11.30 A.M., losing the kayak and our only reliable rifle, the army Springfield. Every one grieves very much over the ‘ Little Man’s ’ death, not alone on account of the critical condition in which we are left as regards food, but on account of the strong affection we all had for his great heart, unvarying truthfulness and integrity. Long said they had been watching an oosuk on a floe which was separated from the fast ice, in the hope that the floe would drift in, but after a long delay Jens concluded to try and reach the seal, and started over the first pool of water in his kayak, taking a screen so as to crawl up on the oosuk. He crossed the first lead all right: and dragged his kayak up, and pushing it into the second lead, started across. It is possible that the kayak was cut by the new ice, as in the middle of the second pool Long observed that he suddenly commenced paddling very rapidly, and the rear of the kayak appeared to be inclined upward. Jens made an effort to jump with the kayak on the ice, which unfortunately was new and unable to bear his weight. The kayak remained in sight for an hour or two, during which time Long, at great personal danger, succeeded in getting within a foot of the body: but was compelled to retreat, after twice breaking through the young ice, by the drift of the floe, which, having touched the fast ice, was being separated from it by the tide.



THE DEATH OF JENS.

Long said that Jens was dead when he first came near to him, and that the kayak was filled with water."

Jens Edward, though an Eskimo, was a man and a Christian of whom no evil word was ever spoken, and on whom no shadow



An Etah Native.

(From a photograph by the Lieut. Expeditions.)

of fault rested in his three years' life with us. Of his conduct on a critical occasion (April 11th) Brainard writes: "The floe on which Long was standing broke from the main ice and drifted out to sea. Jens from a distance, discovering Long's situation, paddled out to him in the kayak. Long urged him in vain to return to the fast ice and save himself. The faithful fellow doggedly refused to go, and

said in his simple way: 'You go, me go too!' Fortunately the turning tide wafted their ice-raft to the fast ice."

"April 30th.—The death of Jens did not seem to affect the spirits of the party last evening, but to-day they are as a whole much depressed. Lieutenant Kistingbury is in a particularly gloomy state.

CHAPTER XLIII.

THE LAST OF OUR RATIONS.

MAY opened dismally, with a snow-storm. Brainard continued indefatigably his work of catching shrimps, of which he brought in no less than four hundred and fifty pounds from April 8th to 30th. On May 3d, however, our last bread was gone, and but nine days' meat remained, even at the small ration then issued. Every one favored, for once, a reduction to the minimum. Our hunters kept the field daily but saw little game. On the 3d Long visited Rice Strait and killed a seal, which, drifting toward him, sank within ten feet of him.

In the early days of May I was very ill, and expected hourly to pass away. When I was in the worst condition Whisler was detected by Bender and Henry with bacon from the storehouse. The three men were outside, and Whisler claimed that the door was forced by the others, and he, passing by, saw the food, and was too ravenous to resist. Bender and Henry said that Whisler forced the door, and they detected him. I was too sick to do much in the matter. The entire party expressed themselves in the harshest manner, and Whisler, pleading guilty to having been unable to resist the temptation to take the food, announced himself ready to pay any penalty. Henry, who was on parole, joined in the cry.

"May 6th.—A violent storm commenced at three o'clock this morning, and gradually abated, dying away at noon. Dr. Pavy made trouble to-day by false statements on three dif-

ferent points, as regards his reports made daily to me in French, and an acrid discussion followed. I ordered him four times to drop the matter, and finally told him were he not the doctor I would kill him. As a consequence Private Bender attempted to defend the doctor, and, despite repeated orders, would not be quiet. A mutiny seemed imminent and I would have killed him could I have got Long's gun. Things have come to such a point that my orders, by these two men, are considered as binding or not at their pleasure. I fear for the future."

This entry is given as it was written by me at the time. I was then suffering greatly from the only serious illness of my three years' absence, and I doubt not now but that my mental condition was irritable, and perhaps unsound; but, looking back at the affair, I cannot think otherwise than that my decision was just and proper under the circumstances. When reiterated orders given by a commanding officer of a party in such extremities are not obeyed, it is evident that all bonds of discipline are at an end, and that threats and force to insure obedience are fully justifiable.

"May 7th.—A high wind all night. Spent nearly all day in getting my personal effects in order, so as to insure their preservation in case of my death. I have pinned to most of the few little articles which I have, a paper setting forth that they are my property, and what has been their history. Others of the party are engaged in a similar manner, although they are all in good spirits. The storm being too violent for hunting, Frederick and Long cut out a part of the boat and covered the aperture with canvas."

"May 9th.—Frederick was back from hunting at 1 A.M. He reports having seen a school of twelve white whales and many seals, but unfortunately all of them were in open water.

I wrote out wills to-day for Whisler and Salor. The party appear generally stronger. Israel's extra allowance of four ounces of meat stops to-morrow."

"May 10th.—An exceedingly cold morning, the temperature standing at zero (-17.8° C.) at 1 A.M., at which time Frederick returned from a nine hours' hunt. He saw four seals and a white whale. The channel is entirely clear of ice, as indeed it has been for several days. It is positive that there is no party at Littleton Island, or we should have seen some one here from there by boat ere this. Long was out all day, but saw no seals. The ice was very rotten and dangerous, and he broke through in several places. The party somewhat improved in condition."

"May 11th.—The temperature at 2 A.M., when Frederick returned from hunting, was -4° (-20° C.), an extremely low one for this time of the year. Frederick succeeded in killing an oosuk seal in a water-pool, but unfortunately he sank instead of floating into the fast ice. The temperature at noon in the sun was 37° (2.8° C.). The party are in much better spirits than for some time. It seems strange that it should be so, as we have, after to-morrow, but two or perhaps two and a half days' rations."

"May 12th.—Frederick back about 1 A.M., having seen only a seal and a (burgomaster?) gull. Long out all day, but saw no game. Consulting with Brainard to-day, I decided that it would be best to divide the last of our regular rations, which will last until noon of the 15th, with a small quantity of tallow for the afternoon stew of that day. I thought it best to pursue this course and remove one source of uneasiness, as it was barely possible that one or two of the worst men of the party might break in and appropriate the remaining food, hoping thus to save themselves at the expense of the others."

"May 14th.—Brainard got shrimps and kelp as usual. Dis-

covered to-day that about five ounces of Elison's bacon has been taken by some unknown person. A couple of days since an ounce of Long's lunch was stolen. Extremity is demoralizing some of the party, but I have urged on them that we should die like men, and not as brutes. Elison's spirits are wonderfully high. He now lives on the same ration as the rest of us. He thanked me most touchingly for the consideration he thinks I have shown him, which is only the poor fellow's due. Dr. Pavy says that he will outlive all of us."

" May 15th.—Long suffered so much from weakness that he was compelled to return early from hunting. The party are all very weak, but continue in good spirits. The sea-kelp and shrimps form our only food from to-day, until we are driven to eating the seal-skins."

" May 17th.—Ordered Biederbick to divide up all the remaining hard which had been saved for medicinal purposes. He divided it as accurately as possible, each person getting about three ounces. Dr. Pavy, however, objected both to disposition and division."

" May 18th.—Very stormy last night and this morning. I heard a raven croaking this morning and called Long, who succeeded in killing him. Gave Long the liver, and concluded to use the bird for shrimp-bait, thinking we could obtain more from him that way than in eating. A violent storm kept everybody in the hut to-day except Brainard, who went for shrimps. Ellis very weak to-day. Bender treated him brutally, so that even Henry rebuked him. I reprimanded Bender sharply for his lack of feeling, although he is probably somewhat insane and not entirely responsible."

Ralston says: "Tried a feed on saxifrage (*Saxifraga oppositifolia*); it is beginning to show green on the ends. I am going to keep up hope as long as I am able to walk, although

my feet are in horrible condition. We are only praying for one small seal. A few snow-buntings now seen every day. Psalms and prayers read by the commanding officer."

"May 19th.—Frederick going out to get ice to cook breakfast this morning returned immediately, reporting that as he emerged from the passageway he saw a bear within a few yards of the house. Long and Frederick dressed for the hunt, and started after the bear, but returned about 10.30 A.M., having been unable even to get a shot at him. Their weakened condition was such that the bear easily outstripped them. Our agony of hope and fear while the hunters were absent cannot be adequately expressed by language. The last alcohol issued to-day, except a few ounces for medical purposes which the doctor will prescribe. Israel and Whisler have quite broken down, and the whole party is in lower spirits than ever before. Private Ellis died at 10.15 A.M." Ellis was a strong, active man, capable at times of great endurance.

"May 20th.—Ellis buried at noon to-day; the first death from starvation in six weeks. The day was too stormy for hunting, but Brainard managed to obtain shrimps as usual. The party are decidedly weaker. In order to give Israel the last chance, and on Dr. Pavy's recommendation, four ounces of the raven was given him to-day, that being our only meat."

"May 21st.—A saxifrage seen in blossom.* We are now mixing saxifrage in our stews; fully nineteen-twentieths of it is the dead plant, with but the faintest tinge of green at the ends. My appetite and health continue good. It is evident that I shall die, as have the others, of lack of food, which induces dropsy of the heart. Lieutenant Kislingbury and Ralston are very weak.

* This plant (*saxifraga oppositifolia*) was in a very sheltered place, and is probably the earliest ever seen in blossom in such a high latitude, 78° 50' N.

Dr. Pavy is working wonderfully hard getting ice for water, and, strange to say, is making a collection of stones covered with lichens. His strength and energy lately are quite surprising, I am glad to write something good of him."

Later I learned from Sergeant Israel that Dr. Pavy had persuaded him to copy a certificate written by the doctor as to his professional services, and that during my absence from the hut it had been circulated for signatures. The writing of the certificate was followed that evening by a recommendation from Dr. Pavy to give Israel our last meat.

" May 22d. It is now eight days since the last regular food was issued. It is astonishing to me how the party holds out. I have been obliged to feed Ralston for a couple of days past. About 2 P.M. he succeeded in eating a part of his dinner, but the rest he could not force down. When tea came, about 3.30 P.M., I asked him if he wanted it, and he said yes. I raised him up, but he became unconscious in my arms, and was unable to drink it. The strength of the party has been devoted to-day to pitching the wall-tent some three hundred yards southeast of the present hut, on a level, gravelly spot in the sun's rays. The doctor says that the party will all die in a few days without we succeed in moving from this wretched hut. The melting snow rains down such a quantity of water upon us that we are saturated to the skin and are in a wretched condition."

" May 23d.—Ralston died about 1 A.M. Israel left the bag before his death, but I remained until driven out about 5 A.M., chilled through by contact with the dead. I read the burial service over him, and ordered him to be buried in the ice-foot northwest of the camp, if the party were unable to haul him to the hill. The weakest of the party moved to the tent upon the hill this afternoon. Whisler managed to get up the hill alone; he became weaker, however, in the afternoon, and is uncon-

scious this evening. Israel was able to walk half way, but the strongest had to haul him the rest of the distance. I succeeded in getting to the tent with great difficulty, carrying the afghan in which I have been sleeping, using it as an inner bag.

The barometer was broken in removing it to the hill—a great misfortune, as I had hoped to continue the observations until the last man died. We have made these observations regularly, with few or no breaks, until the present month, when the rapidly diminishing strength of the party compelled a discontinuance of certain of them.* Long hunting to-day saw a gull (long-tailed skua). Brainard got only ten pounds of shrimps; less by far than we are eating. It is a sad state of affairs, and the end must be near.”

Ralston was an excellent observer and an efficient man in the field, with whom I never found a shadow of fault until his last days at Sabine.

“ May 24th.—The tent is much more comfortable. The temperature reached 39° (3.9° C.) inside it this morning. Whisler unconscious this morning, and died about noon. I read the service over him, and he was left outside near the tent, where he had died, for the present. Ralston buried this morning on the hill, I believe. The last issue of rum was made to-day, and a gill or so remains for medical purposes. Israel is exceedingly weak; he realizes that his end is near and is reconciled. Frederick and Long worked hard to complete the change of camp. For dinner we had a handful of saxifrage, two or three spoons-

* The *approximate* means of pressure and temperature deduced from these readings were, in 1883: October, 30.03; 1° (-17.2° C.). November, 29.92; -18.2° (-27.9° C.). December, 29.88; -21.8° (-29.9° C.). In 1884: January, 29.83; -28.1° (-33.4° C.). February, 29.70; -21.4° (-29.7° C.). March, 29.81; -20.2° (-29° C.). April, 30.13; -2° (-18.9° C.). May, 30.16; 18° (-7.8° C.). June ; 33.6° (0.9° C.).

ful of shrimps, and a pint and a half of tea. Schneider was guilty of abusive language to Whisler yesterday when he was dying; the second case of this kind. I gave him a severe reprimand, and asked him whether he had any humanity or not. Dr. Pavy, Brainard, Long, Henry, Salor, and Frederick, the strongest of the party, are yet quartered in the remains of the



Sergeant David L. Brainard.

(Sole survivor of those who reached the Farthest North.)

old hut; taking their meals, however, with us at the tent. We have not enough canvas to cover them all here, as we were unable to get out the tent-flies, which were frozen to the ground in the hut. Frederick and Schneider are trying to construct an addition to the tent out of blankets and old canvas, so that we may all sleep under the same shelter. The sick men complain of Schneider's unfairness in dividing the food, which is

undoubtedly true. Frederick, ordered to watch him, reports that he is unfairly dividing our wretched shrimps, giving equal soup but keeping too great a portion of shrimps, and I ordered him relieved as cook. It is wretched. Of the party, at present seven are helpless. Brainard is breaking himself down getting our shrimps. A violent storm again last night, which is not very bad this morning, but still no hunting is possible."

Whisler was a man of fine physique, who had always labored his best to advance the interests of the expedition.

"May 26th.—The storm was so bad this morning that Brainard could not go shrimping, but this afternoon he got eight pounds. Owing to his failure to obtain shrimps, we had a stew last night and this morning of the seal-skin thongs which have been used in lashing together the sledge and for similar purposes. How we live I do not know, unless it is because we are determined to. We all passed an exceedingly wretched night. The stronger of the party succeeded in burying Whisler very early this morning. Israel is now in an exceedingly weak condition, and unable even to sit up in his bag. I am compelled to raise him and feed him, which is a tremendous drain on my physical strength. He talks much of his home and younger days, and seems thoroughly reconciled to go. I gave him a spoonful of rum this morning; he begged for it so exceedingly hard. It was perhaps not fair to the rest to have given it to him, as it was evident it could not benefit him, as he was so near his end. However it was a great comfort and relief to him, and I did by him as I should like to have been done by in such a time. Nobody objected to my action openly, as Israel has always been a great favorite. Long hunting to-day; saw a flock of king-ducks, and succeeded in killing three dovebies, which fell into the water beyond reach. It is a comfort to us that some game has appeared, and that there is a possible chance."

" May 27th.—Long killed a dovekie, which he could not get. Israel died very easily about three o'clock this morning. I gave him yesterday evening the last food he ate. A very unpleasant scene occurred to-day. Dr. Pavy in the afternoon took all the remaining iron from the medicine-chest. I ordered him to return it there, he having been accused to me by Steward Biederbick, Sergeant Ellison, and others of taking large quantities of Dover's powders, and he has lately failed to issue iron to the party as he promised. There was a violent scene, and Lieutenant Kislingbury, as usual, thought Dr. Pavy right. Lieutenant Kislingbury interfered more than I thought proper, and I ordered him to cease criticizing."

Sergeant Israel was a young man of some fortune, a graduate of Ann Arbor University, a promising astronomer, with a future before him. His death affected me seriously, as his cheerful and hopeful words during the long months he was my bag-companion did much to hold up my hands and relieve my over-taxed brain. He had always endeared himself to all by his kindness, consideration, and unvarying equanimity, and was often called at Sabine our Benjamin. His services were very valuable in our scientific work, and despite his weak physique he had sought field service. In reading the burial service I was mindful of him and his people, and omitted every portion which could be distasteful to his coreligionists.

" May 28th.—Long shot two dovekies to-day, but got only one of them. I divided it between him and Brainard, the men who are feeding us at present. Long saw king and eider ducks, but they were not near enough for a shot, being too shy. The men this evening are in very good spirits: however they all believe and say that we have no chance of surviving."

" May 29th.—Brainard returned exhausted and half frozen from his shrimping trip, and was obliged to sleep outside the

tent in the storm, as Dr. Pavy and Salor, who are in Brainard's bag, crowded him out, refusing to make room for him inside. Brainard took the matter very quietly, although in his weak condition he suffered greatly from cold and exposure."

"May 30th.—Snowing this morning. Succeeded in getting some food warmed, it being the only food or drink for twenty-eight hours. Brainard got very few shrimps to-day. He saw, however, some geese. A great deal of conversation took place regarding Decoration Day, and what was being done in the world from which we are cut off."

"May 31st.—A violent southerly storm set in at midnight, and lasted twenty-four hours, keeping everybody in their bags. The wind must have reached a velocity of fifty miles per hour at times, and averaged at least thirty miles per hour for six or seven consecutive hours. These long stretches without food or water are very exhausting to us."

Brainard, commenting on the conflicting feelings at first engendered by the sight of his comrades' graves passed daily, says: "But later my own wretched circumstances served to counteract these feelings, and I can pass and repass the place without emotion and almost with indifference."

In these days thought was an effort, save when I was irritated by some unpleasant occurrence, or important event, into unusual energy, and writing a great labor; so that the contents of my journal became at times exceedingly meagre.

CHAPTER XLIV.

THE END—BY DEATH AND BY RESCUE.

SUMMER opened wretchedly, with a howling gale and driving snow, and a temperature near the freezing-point. For a day and a half an unbroken fast depleted our little strength. We were yet fourteen in number, but it was evident that all must soon pass away, unless our hunters were more fortunate or relief came speedily. My journal continues:

“ Long saw to-day a flock of long-tailed ducks. Had breakfast this morning of shrimps and sea-weed, after a fast of thirty-four hours without either food or drink. Everybody very wretched, not only from the lack of food, but from the cold, to which we are very sensitive. Lieutenant Kislingbury, who was exceedingly weak in the morning at breakfast, became unconscious at 9 A.M., and died at 3 P.M. The last thing he did was to sing the Doxology and ask for water. I read the burial service in the afternoon, and the body was moved outside of the tent. The party will try to bury him to-morrow. Long killed a dovekie, which I ordered divided between him and Brainard. In firing at the bird Long was kicked in the face by the gun and blinded, and with difficulty succeeded in reaching the tent. He and Brainard were out seven hours and a half, and Brainard was able to work only about two hours getting shrimps, spending the rest of the time in travelling to and fro. In connection with Lieutenant Kislingbury it should be said, as a

matter of justice to him and me, that during the past six weeks he has been at times out of his head, excitable, and unable to remember. In consequence several unpleasant discussions have occurred between us, and at a misstatement which placed me in a false position I, in a moment of anger and excitement, called him a liar, but later apologized publicly to him and the party. What he said was not so, but I now think his mind and memory must have failed him at that time. We were fully reconciled before his death." I look back on this affront to Lieutenant Kislingbury with a deep and abiding regret that I should have so forgotten what was due to my men and myself as to allow a sense of wrong and irritation to overcome my cooler judgment. A commander should ever be considerate of his subordinates, and that I this time failed in my own weak and irritable condition may be pardoned I trust.

Lieutenant Kislingbury was the only one of my party whom I had known before contemplating Arctic work. He had served under me in building Government telegraph lines, and had expressed a desire to accompany me to the Arctic when I first conceived the idea of going. He was an active, hardworking officer, who had acquired an excellent reputation for frontier and Indian service. The qualities which insured success then, perhaps caused him to chafe under restraints where his work and actions were strictly limited. A successful hunter, a hardy man, he never spared himself in labors which would add to the personal and physical comfort of others. He worked hard and manfully during our boat retreat and subsequent life at Sabine.

"June 2d.—Toinette's birthday. Connell requested me to enter his wish that, in case of his death, his diary should be sent to his late commanding officer as a sign of good-will and respect. The day proved to be a beautiful one. Long shot a

dovekie, which was ordered to be divided between the hunters, and the intestines were to go in the general shrimp stew to give it flavor. Salor is very weak, as is Gardiner. This evening Salor has been somewhat delirious, and I think he will die to-night. Gardiner expressed his earnest desire that his journal, in case of his death, should eventually go to his wife."

"June 3d.—Corporal Salor died this morning about three o'clock. Read the burial service over him. Dr. Pavy is quite weak and unwell, and this afternoon was evidently out of his head. He wanted, among other things, to prescribe calomel for me, although I am in very good condition, and also wanted to mix up and issue all the alcohol left. He prescribed ammonia for himself, and bismuth for Long, which I gave. For a pain in Bender's groin he prescribed iron, and when Connell complained of cold and asked for ammonia the doctor said yes; but I refused it to Connell, as we have but a small quantity, and its issue can be permitted only when really necessary. I am sorry to refuse medicine, but cannot do otherwise unless the necessity is plain. A strong southerly gale prevailed during the whole day, which prevented Long from hunting; Brainard, however, was out and got six or seven pounds of shrimps."

Salor was an honest, reliable, hard-working soldier, and was an energetic and important member of the supporting party toward attaining the Farthest North.

"June 4th.—A strong gale lasted all night, which gave place to a clear, fine, warm day. Dr. Pavy weak to-day, but much better mentally. I had a discussion with him regarding the use of the tripe de Roche, which are to be found in considerable quantities. He has always advised me to refrain from using them, and still continues of the same mind, quoting Richardson,

Franklin, and Hayes, and says it is unhealthy, and nothing but suffering can come from it; that, if any one of the party should be taken with diarrhœa, in their present weak condition, it would certainly be fatal. Brainard, Frederick, Henry, and Bender, however, recommend trial of this lichen. This afternoon concluded to try the tripe de Roche, and ate considerable of it, an ounce or so. The leaves are very dry and have little or no taste, but are evidently nutritious. We had not strength enough to bury Salor, so he was put out of sight in the ice-foot. Long saw four dovekies, two king-ducks, and a large guillemot; he however got but one dovekie, losing the six by the current. I ordered the dovekie to be issued to the hunters, who can barely walk, but Bender begged with tears for his twelfth, which was given him with everybody's contempt. There was a great deal of discussion as to whether he should have it or not. As there seemed to be some feeling over the point after Bender's allowance was given him, I told the party that the hunters must be kept on their feet; and that unless they were sustained, so as to enable them to obtain shrimps, the party must perish at once; that Long could not be expected to hunt without being fed. Henry stealing again from our shrimps. Schneider and Bender also suspected. It will be necessary to take some severe action, or the whole party will perish.

"Our condition grows more horrible every day. No man knows when death is coming, and each has long since faced it unmoved. Each man who has died has passed into the preliminary stages of mental, but never violent, wandering without a suspicion that death has marked him."

Only those who lived knew, and at the first wanderings we looked at each other, conscious that still another was about to pass away. To sleep was perchance to die, and so I never composed my mind for sleep without a strong sense of uncertainty

that ever again should I wake to life and consciousness. This uncertainty of life or death was a veritable sword of Damocles, but far worse than the fable; for with us from day to day the thread snapped and the sword fell upon the heads of our comrades, and day to day we felt the certainty that in a few days—God only knew how many—the same fate awaited us. This constant expectancy of death, at first a sharp, dreadful trial, gradually passed into a vague and deadening feeling, which nevertheless was a terrible mental strain to the end. The easy and painless deaths removed all fear of the agonies of dissolution, which so many dread far beyond the uncertainty as to their future. With us, in those dreadful days, death kindly took away all pain and suffering when he had touched his victim.

“June 5th.—A clear, calm, and fine warm day. I crawled on the rocks to-day, and got a canful of tripe de Roche—half a pint. On some one's recommendation I tried them in my stew, and found their taste very much improved. Some reindeer-moss was also found. Henry troubled with slight diarrhoea from tripe de Roche. Bender made a will. Dr. Pavy very weak and exceedingly flighty. He continually tells us that he is getting stronger and better, but it is evident to everybody that he is in a very bad way. Indeed, however, the whole party are breaking down. Long saw a few birds, but got none. Brainard out several hours this morning, but succeeded in getting only five pounds of shrimps. Henry acknowledged again to me that he had been stealing, and I had a long conversation with him, in which I told him that as he had no conscience he might at least have a little common-sense; that it was evident that if any of the party survived, it must be through unity and fair dealing, otherwise everybody would perish. He promised to deal fairly in the future, and seemed impressed with my caution that he would come to grief if he

did not. I felt doubtful of his sincerity, however, and consequently have given the following written orders :

“ ‘NEAR CAPE SABINE, June 5, 1884.

“ ‘TO SERGEANTS BRAINARD, FREDERICK, AND LONG :

“ ‘Private Henry having been repeatedly guilty of stealing the provisions of this party, which is now perishing slowly by starvation, has so far been condoned and pardoned. It is, however, *imperatively ordered* that if this man be detected either eating food of any kind not issued him regularly, or making caches or appropriating any article of provisions, you will at once shoot him and report the matter to me. Any other course would be a fatal leniency, the man being able to overpower any two of our present force.

“ ‘A. W. GREELY,

“ ‘*Lieutenant Fifth Cavalry, U.S.A., and Assistant.*’ ”

“ June 6th.—Fine, warm, clear day. Frederick detected Henry stealing shrimps out of the general mess-pot when his back was turned. Later Henry made two trips to our old winter-quarters, and when returning from the second trip, while passing me, I stopped him and questioned him as to what he had been doing, and what he had with him. After a while he admitted he had taken from there, contrary to positive orders, seal-skin thongs ; and, further, that he had in a bundle, concealed somewhere, seal-skin. He was bold in his admissions, and showed neither fear nor contrition. I ordered him shot, giving the order in writing :

“ ‘NEAR CAPE SABINE, June 6, 1884.

“ ‘SERGEANTS BRAINARD, LONG, AND FREDERICK :

“ ‘Notwithstanding promises given by Private C. B. Henry yesterday, he has since, as acknowledged to me, tampered with seal-thongs, if not other food at the old camp. This pertinacity and audacity is the destruction of this party, if not at once

ended. Private Henry will be shot to-day, all care being taken to prevent his injuring any one, as his physical strength is greater than that of any two men. Decide the manner of death by two ball and one blank cartridge. This order is *imperative, and absolutely necessary for any chance of life.*

“A. W. GREELY,

“*First Lieutenant Fifth Cavalry, U.S.A., and Assistant,
“Commanding L. F. B. Expedition.*”

“About two o'clock shots were heard, and later the order was read to the general party. Every one, without exception, acknowledged that Henry's fate was merited. On searching his bundles very considerable quantities of seal-skin were found, as well as a pair of my seal-skin boots which I had loaned to Long a short time since, and which had been stolen from him **two** nights before. There was found in his pocket a valuable silver chronograph left by me with other scientific instruments at Conger, and stolen by him on our departure. Fully twelve pounds of seal-skin were found cached among his effects.”

It is apparent from these records that I had exercised a remarkable, perhaps too lenient, spirit of conciliation and forbearance in the treatment of men who purloined food. No one appreciated more than myself the tremendous strain and determination needful to resist the great temptation of appropriating a morsel of food to satisfy the terrible and continual gnawing at our vitals. As long as we were exempt from death, and food yet remained, I could not bring myself to resort to violent measures. Henry's many offences were condoned up to June 5th, in common with others, with due warning. His execution was regarded by me simply in the light of self-defence for the remnant of my party, and was ordered on my undivided responsibility. A verbal report was made the

moment I met my departmental superiors, several days prior to Henry's burial, and a written report at the earliest moment, before the facts of his death were made public.

The following letter, in answer to my request for a trial or inquiry in this case, completes its history :

“WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE,
“WASHINGTON, November 14, 1884.

“LIEUTENANT A. W. GREELY, Fifth Cavalry, Acting Signal Officer, through the Chief Signal Officer, U.S.A. :

“SIR : Referring to your letter dated August 11, 1884, reporting that on June 6, 1884, at Camp Clay, near Cape Sabine, you had ordered the military execution of Private Charles B. Henry, Fifth Cavalry, a member of the expedition under your command, giving the details of the cause of such execution, and asking for the appointment of a court of inquiry in the matter ; I have the honor to inform you that, upon consideration of your report, in connection with extracts from the diaries of the several members of the Lady Franklin Bay Expedition, and also in connection with the diary of Private Henry himself, the Secretary of War entertains no doubt of the necessity and the entire propriety of your action in ordering the execution of Private Henry under the circumstances and in the manner set forth in your report.

“The Secretary therefore does not consider that the appointment of a court of inquiry to investigate the matter is required by the public interests.

“Very respectfully, your obedient servant,

“R. C. DRUM,

“*Adjutant-General.*”

My journal continues : “I learned this afternoon from Steward Biederbick that Dr. Pavy, while at the medicine-chest

yesterday, took away the extract of ergot, and has since drank all in the bottle, about three ounces. Biederbick says that, after Dr. Pavy left the medicine-chest, he examined it to see what had been taken, but did not notice the absence of the ergot bottle, as it was a medicine for which we had no use. Dr. Pavy is now (5 P.M.) at the point of death, which has doubtless been hastened a day or two by this action on his part. Bender is also dying.

"Later.—Bender died at 5.45 P.M. very easily. I think his death was hastened by Henry's execution. Dr. Pavy died at 6 P.M. His death has evidently been hastened by the narcotics. Biederbick thought that he believed the ergot to be iron. By all accounts he has dosed himself continually, and to this I ascribe his sudden break-down, as, until the 2d of this month, he was one of the strongest of the party. There are now but nine left. Long killed a dovekie, which I ordered to be divided between the hunters and Frederick. Long saw many ducks to-day. Brainard was out nearly seven hours, and got less than three pounds of shrimps. We must begin on our seal-skin clothing. I got to-day a large quantity of tripe de Roche lichen, and found them very nutritious: they certainly are very palatable."

Dr. Pavy was a man of fine education, polished manners, and great Arctic ambition. To his credit at Camp Clay must be recorded the restless energy which marked his physical exertions in behalf of the party the last month of his life. His medical skill was great, and contributed much to the general welfare of the party the last winter. His defects and shortcomings have been lightly touched on in my diary. It should be added that his uncertain and changeable moods, and the habits arising from his previous Bohemian life, unfitted him for duty where his actions were subject to restriction or limitation from others.

Bender was an ingenious, hard-working man, who had done good service in various ways both at Conger and in improvising means from scanty material at Sabine.

“June 7th.—I read the burial service over Dr. Pavy and Bender, and their bodies were removed a short distance from the tent. It is not known whether we will have strength enough to bury them on the hill or in the ice-foot; probably the latter. All the shrimps were eaten for breakfast. This is the first time we have been absolutely without a supply of them. Everybody is now collecting reindeer-moss, tripe de Roche, and saxifrage, all of which it is possible for us to eat. The party, however, is so weak that it can do but little. Brainard, Long, Frederick, Biederbick, and I are the only ones who can get about. Gardiner is very weak, and can live but a few days longer. Schneider also very feeble. Elison's wounds are suffering from his low diet, but he is yet strong. Find, in getting seal-skin together this afternoon, that much is missing. Schneider says that Henry and Bender were eating it, and that he begged them to give him some but they would not. It is thought that Schneider was in the ring, and he is continually twitted by the party.”

Henry was the only one who was bold in his thefts, acknowledging them with audacity, and was in the best physical condition of any man in the party. Schneider was in very feeble condition and seemed near death at this time.

It is interesting in this connection to note what Schneider says; I quote from his diary,* which has just come to me:

“Lots of seal-skin and thongs were found on the doctor and Bender both, which showed how dishonest they was. Although

* Schneider's diary, stolen without doubt by a seaman of the relief squadron, was found in a mutilated condition on the banks of the Mississippi River, and was sent to me by Mr. J. A. Ockerson, U.S. Civil Engineer, as these sheets were going to press. It includes from part of June 6 to June 17, 1884.

Henry has told before his death that I had eaten a lot of seal-skin, yet, although I am a dying man, I deny the assertion: I only ate my own boots and a part of an old pair of pants. I feel myself going fast, but I wish that it would go yet faster."

"June 8th.—Clear and calm all day, with temperature ranging from 38° to 40° (3.3° to 4.4° C.). A beautiful Sunday. Find very little oosuk-skin on hand. Henry, Bender, Dr. Pavy, and Schneider have been eating lashings, thongs, boot-soles, etc., which happened to be in their possession. Was out to-day on the rocks just in rear of the tent, and managed in five hours' time to pick about two quarts of tripe de Roche; Biederbick got about the same, or perhaps a little more. Connell gathered about six pounds of dried saxifrage for fuel. Brainard brought in only two pounds of shrimps. Obligated to eat the last seal-skin thongs in stew this afternoon, with which we mixed the tripe de Roche and reindeer-moss. The day has been a very warm and pleasant one. I am treating myself. Biederbick is sick and very weak this evening. Gardiner is very weak; and Schneider also, but better than yesterday. Connell is about the same. The others are quite worn out by their work; Long in hunting, Brainard shrimping, and Frederick cooking. Found a bunch of purple saxifrage in full bloom. Brainard found yesterday a few Eskimo relics. We told him it was a ruling passion strong in death, as he has always been gathering up articles of that kind."

"June 9th.—A calm, fair day; temperature ranging from 36° to 42° (2.2° to 5.6° C.). The party succeeded in getting Dr. Pavy and Bender into the ice-crack. All are very weak. Connell shows signs of scurvy in bleeding gums, and Schneider in his swollen, stiff knees, while Gardiner and Biederbick are weaker. I was out on rocks fifty yards distant for six hours, and got a quart of tripe de Roche; and Biederbick the same.

Connell gathered five pounds of saxifrage. Brainard got about two pounds of shrimps. Long very weak and sick, unable to hunt last night. It is his thirty-second birthday. Gave him a spoonful of the gill of brandy remaining. Schneider this evening appeared to wander a little. Had nothing but tripe de Roche, tea, and seal-skin gloves for dinner. Without fresh bait we can do little in shrimping, and so live on lichens and moss alone. Elison expressed a desire that his arms and legs should go to the Army Medical Museum in the interests of science. His case is most singular; he is in the best health of any of us. Schneider is doing no outside work, but wrote up yesterday an account of Elison's November trip at his dictation. Biederbick is engaged in writing up the medical case; his term of service expires in five days, and he promises faithfully to complete it, but cannot believe that he will last much longer. His service has been faithful indeed."

"June 10th.—A calm, cloudy day, with temperature from 35° to 40° (1.7° to 4.4° C.). Gardiner is suffering very much. Long killed last night a Brent goose, which he lost, and a dovekie. The dovekie went to the hunters to-day, although there were some unpleasant remarks made about it. Very few shrimps were obtained. In the evening had only a stew of the tripe de Roche which was gathered by Biederbick, Schneider, and myself. I was out nearly five hours, until driven from the rocks thoroughly chilled. The stewed tripe de Roche to-day was delicious, having boiled it for the first time. It leaves a sweetish taste in the mouth. Biederbick told me this evening that inflammation of the bowels had set in in Gardiner's case, which must soon prove fatal."

"June 11th.—A clear, calm day, with temperature from 38° to 42° (3.3° to 5.6° C.), the warmest of the season. Thermometer exposed to the direct rays of the sun registered

62° (17.7° C.) this morning. Gardiner is in a very dangerous condition. Schneider is also very weak, and was unable to go out for lichens. Biederbick weak, but went for lichens, as did Connell and I. Long this evening brought in two fine guillemots, one of which goes to the general mess and one to the hunters; our only chance is to keep strength in them and in the cooks, so I directed that they eat, while out, such extra tripe de Roche as they could pick."

"June 12th.—A clear, calm day, the temperature ranging from 34° to 38 (1° to 3° C.). Long came in with no game; and Brainard brought back the unfortunate news that the floes at his shrimping-grounds had broken up and been driven out by the late gale, so that he lost not only the shrimps, but the nets and rope. In consequence we have for breakfast only tea and such roasted seal-skin as each one has left from the part issued a few days since. The misfortunes of the day are very discouraging, and affected the spirits and temper of some of the party. Gardiner died to-day of inflammation of the bowels and starvation. He was apparently dead at 11 A.M., and was removed from the tent; but, showing signs of life, later was deposited on an old buffalo-robe, where he died about 5 P.M. It will be necessary to bury him in the ice-foot. His death touched us all very nearly. We have become hardened to death by his constant invasion of our party, but Gardiner's death seemed especially trying, as he has appeared to live mainly by will-power for the past two months. The doctor predicted in April that Gardiner would be the next one to go, but he has lived until this time, six days later than the doctor himself; and mainly, as I believe, from his intense desire to return home and see again his wife and mother. In the early morning he was partly out of his sleeping-bag, holding in his hands an ambrotype of his wife and mother, which he continu-

ally looked at and frequently spoke to. His last words were "Mother! Wife!" Biederbick to-day reports that Elison has bed-sores, which is not to be wondered at, and that he is weaker. Schneider is weaker, and of course it is needless to say that the remainder of the party are also losing strength. I was out five hours, and succeeded in scraping off the rocks near the tent nearly a gallon of tripe de Roche. Biederbick and Connell were also out collecting what they could. Brainard to-day erected a distress flag on the point of the rocks, as a signal for any rescuing party. To-day is the first day at which any one had looked for a vessel, it being, as my memory serves me, the average date of whalers reaching the north water. Brainard has found a new place for shrimping, and we hope for better results, but are not certain of any. It will be necessary to make new nets, and Schneider has been directed to do the work, as he is unable to do work outside. I decided to have for supper two-thirds of the lichens collected to-day, and to keep the balance for breakfast."

Sergeant Gardiner was a young man of excellent habits, fine mind, and amiable disposition, and had ambition and application. He was a valuable man to the expedition in many ways, and had endeared himself to his comrades. He was more religious than perhaps any other one in the party; although allowed only eight pounds of baggage on the retreat, he denied himself to bring with him his Bible, our only one, though I had a prayer book.

"June 13th.—Strong southerly gale, with the temperature at the freezing-point (0° C.) at 7 A.M., but with a clear sky. Formally discharged Biederbick to-day, his term of service having expired. Having no regular blanks, I gave him a written certificate of discharge, to be replaced by a regular one. Was unable to give him 'final statements.' The cold gale which

sprang up early this morning rendered it impossible, owing to the low temperature, for us to collect lichens. It reduced us to extremities for dinner, as Brainard got but a few shrimps. Issued to the party my seal-skin jumper, which had been reserved for shrimp-bait. Connell, Biederbick, and Schneider succeeded in eating all their allowance; I was able to eat but very little of mine, but ate instead about an ounce or two boiled lashings which I had saved; also cut off the dirty, oil-tanned covering of my sleeping-bag, and divided it between the party, so that each man could have his part as desired."

" June 14th.—Re-enlisted Biederbick as a hospital steward of the first class, subject to approval. The day calm but cloudy, with temperature ranging from 37° to 42° (3° to 6° C.). The party suffered very much from the prevailing wind of yesterday, but Biederbick, Connell, and I were able to pick lichens, of which we got probably a dozen quarts. Gardiner was buried in the ice-crack; the party not being strong enough to dig a grave or carry him to the ridge through the snow. Connell saw an oosuk seal on the moving ice some distance from the shore, and several small seals in pools near the shore. Long has hopes of striking one on the fast ice. Brainard found to-day an old eider-duck's nest, showing that they breed here, which gives us a certain amount of encouragement. Considerable conversation was had to-day over the fact that three years since the expeditionary force sailed from Baltimore."

" June 15th.—Light snow at 7 A.M., with temperature below the freezing-point, being at 30° (−1.1° C.). All weak this morning. Issued to most of the party their part of the oil-tanned skin from sleeping-bag. I cannot eat now, nor can the rest, so that we retained the covering of my old bag to be divided when we cannot do without it. Brainard and Long to-day, owing to some comments of Connell, decided to put all

lichens which they can collect when hunting and shrimping in the general mess, as Frederick, the cook, has lately done. These three are now very weak, but still able to help themselves and the rest. Schneider is quite helpless, more from his mental discouragement than from physical weakness. It is with great difficulty that we can get him to sit up in his bag, and he will only do so when food comes to him, or from great pressure on the part of the entire party. Biederbick, Connell, and I can gather lichens near the tent, but can do nothing else; except Biederbick, who regularly cares for Elison and dresses his wounds on alternate days. Brainard gets a few shrimps. Long hunts, but lately has been unfortunate; I tell him to eat if he gets game; he saw many walruses last night; also ducks, other birds and seals, but none in reach."

I quote from Schneider's diary again: "Two of us, Elison and myself, are unable to do anything. We are living on only a few lichens and shrimps now." On the 16th and 17th he says: "The sleeping-bag cover roasted and boiled to suit each one. I had my skin boiled. . . . I am only able to sew on boots and keep up the diary. The last of the skin divided to-day."

"June 16th.—A strong northwest gale commenced in the straits last night, but abated this morning. The temperature 37° (2.8° C.), at 7 A.M. It was too cold and cloudy in the forenoon to pick lichens. The party are now eating oil-tanned skin, which is very repugnant to us. All are weaker and much discouraged. I do not know how we live, except on our hopes and expectations of a ship. Schneider last evening begged for opium pills, with which he could end his life, but found no one to help him to them. He was in better spirits this morning, but had to be handled like a child this afternoon, being as helpless physically as Elison. Connell's mouth seems much worse. Whether his scurvy is increasing or not I cannot say,

but his guns are certainly in very bad condition, swollen and bleeding. Brainard found the minimum thermometer (No. 590) which was blown away by the gale of December last."

"June 17th.—Brainard brought in substantially no shrimps. It is quite evident that we can get none until we have perfectly fresh bait, as the seal-skin is of no use. Tried saxifrage tea to-day. There was a difference of opinion in the party regarding its quality. Brainard found a lemming-head last night, which was very old; in fact, the bones crumbled to pieces between his fingers. He also saw old tracks of hare, and some musk-ox hair. Biederbick has also seen the latter, which confirms Nares' statement regarding the animal on this coast. Brainard also saw an old walrus-skull. Long saw quite a number of walrus last night. Expectation berg has left us, probably having been floated off by the spring tides. Connell not well to-day; in consequence we got fewer lichens. Frederick seems to be giving out; Brainard was obliged to get wood from the boat. The sun was exceedingly warm to-day, the thermometer in the sun showing a temperature of 63° (17.2° C.), and in the tent of 73.5° (23.1° C.). Issued the oil-tanned seal-skin to the party. Schneider was unable to cut his up, and so I did it for him."

"June 18th.—The temperature was down to 30° (-1.1° C.) last night, and but 30.5° (-0.8° C.), with a fresh wind and clouded sky, at 7 A.M. Schneider was very weak and out of his head in the morning, and later became unconscious. He wandered a great deal, but not unpleasantly, and died at 6 P.M. Brainard got no shrimps; I am afraid we will have to give it up until we get birds or other bait. He is now collecting tripe de Roche with all the rest of us. Long killed two birds, but was unable to get them. Biederbick was troubled very much by rheumatism; but, despite his excruciating pain, showed his devotion by attending to Elison's wounds, and then went out to pick

lichens with Connell and myself. Biederbick says he is much stronger to-night, but Connell complains of being worse, and Biederbick gave him an opium pill. Brainard found to-day a small piece of drift-wood thirty feet above the tide-level."

Schneider had done good service as clerk, and more especially in raising and training the puppies born at Conger, which contributed materially to the success of our geographical work.

On June 20th I crawled out a few yards behind the tent to pick lichens, but Connell was unable to venture out. Biederbick remained in the tent to dress Elison's wounds, and arranged on his stump a spoon, so that the poor cripple could eat his stewed seal-skin. Before Biederbick could come out to assist me a storm came up, which drove me in.

My diary says: "20th, 7 A.M., clear, calm, 29° , minimum 26.8° (-1.7° and -2.9° C.). Six years ago to-day I was married and three years ago I left my wife for this Expedition, what contrast! When will this life in death end?"

The morning of the 21st broke with the gale still raging, and it was with the greatest difficulty that Frederick was able to cook our wretched stew of lichens and heat up some stewed seal-skin, the remnant of the oil-tanned and filthy covering of my sleeping-bag. During the day the gale continued with unabated violence, with a mean temperature of 31° (-0.6° C.), and a minimum of 28° (-2.2° C.), an unprecedented degree of cold for a midsummer day. Our tent gradually gave way inch by inch before the gale, and all efforts to straighten it or to improve our condition proved futile, owing to our enfeebled condition. By evening the front portion of the tent rested on the ground, pinning Brainard, Long, and myself in our sleeping-bags so we could hardly stir.

My diary says: "21st, 11 A.M., south gale, 34° (1.1° C.). At 8.30 A.M., it commenced snowing. Connell's legs paralyzed

from knee down. Biederbick suffering terribly from rheumatism. Buchanan Strait open this noon a long way up the coast."

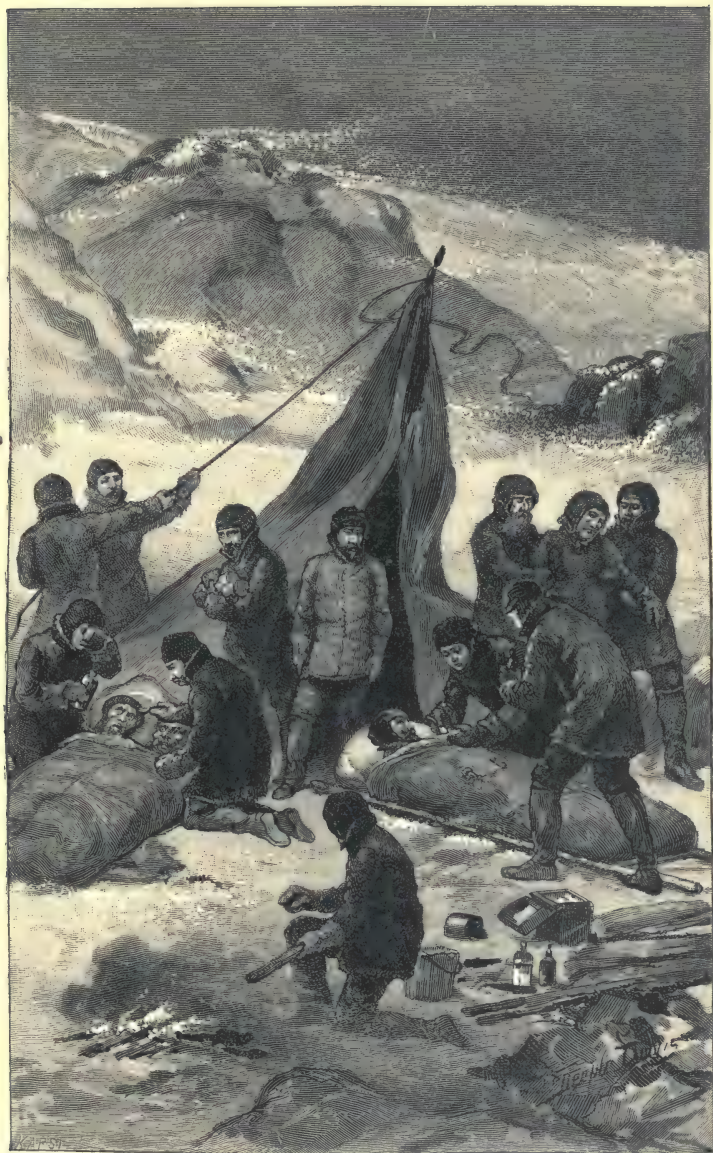
With these words my journal ends. When I began this work I contemplated using my diary for notes, and writing from it, but as I advanced with the records of the last year this became more and more difficult. I am not yet far enough away from that time. Again, it may be quite as interesting to the reader to see what was written from day to day.

The only marked objection to this form is that it does not indicate sufficiently the kindly feeling and thought for others that was daily and hourly testified in that miserable life. This was the rule, and therefore was not dwelt upon. The reverse was exceptional, and so noted; and, as I have before said, the rest must be read between the lines.

By the morning of the 22d we were all exhausted, and it was only through the energy and devotion of Frederick or Brainard, I do not remember which, that we obtained, about noon, some water. That and a few square inches of soaked seal-skin was all the nutriment which passed our lips for forty-two hours prior to our rescue. Connell was very feeble, and the end of all was approaching. I tried with indifferent success to read from my prayer-book and the few scraps we had, but the high wind and lack of food made it too exhausting.

Near midnight of the 22d I heard the sound of the whistle of the Thetis, blown by Captain Schley's orders to recall his parties. I could not distrust my ears, and yet I could hardly believe that ships would venture along that coast in such a gale.

I feebly asked Brainard and Long if they had strength to get out, to which they answered, as always, that they would do their best. I directed one to return with the news if any vessel could be seen. Brainard came back in about ten minutes



THE RESCUE, JUNE 23, 1884.

from the brow of the hill, some fifty yards distant, reporting in a most discouraging tone that nothing was to be seen, and said that Long had gone over to set up the distress flag, a short distance away, which had blown down. Brainard returned to his bag, while a fruitless discussion sprang up as to the noise, wherein Biederbick suggested that the vessel was in Payer Harbor, which I could not believe, as I thought the whistle must be from a ship running along the coast. We had resigned ourselves to despair, when suddenly strange voices were heard calling me; and, in a frenzy of feeling as vehement as our enfeebled condition would permit, we realized that our country had not failed us, that the long agony was over, and the remnant of the Lady Franklin Bay Expedition saved.

Connell, scarcely conscious, was on the verge of the grave, and others were in almost as critical a condition. Biederbick, the moment he realized our relief, acted with the same unselfish and considerate spirit as had ever characterized him. The two spoonfuls of whiskey left were divided; one given instantly to Connell, and on my refusing the second it went with its fellow. As ever in our history, the weak and helpless had naught but kindness and consideration from the stronger.

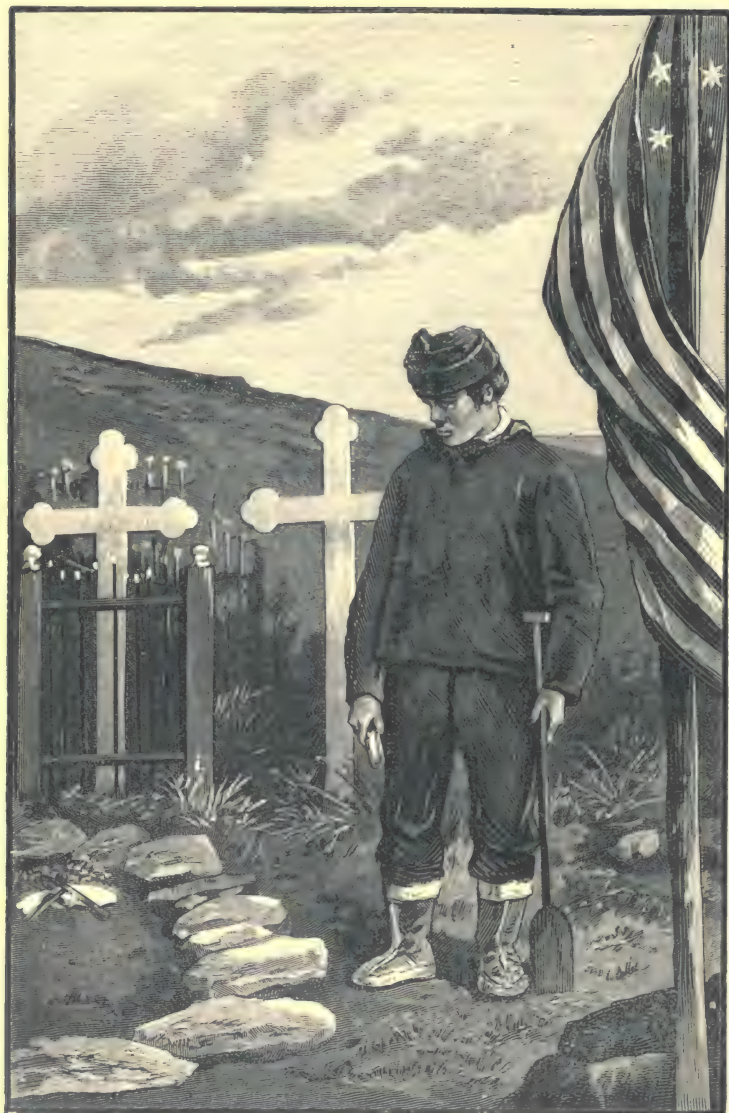
CHAPTER XLV.

CONCLUSION.

IT had seemed impossible to us that ships should venture on that dangerous, rock-bound coast—with a heavy pack threatening—in a gale which was yet so violent that we were transported the few hundred yards to the ship with great peril. Such prompt action and the taking of such risks evidence most strongly Captain Schley's appreciation of the urgency of the situation and his ability to cope with it. More caution and less daring on his part would have proved fatal to us.

The officers of the squadron treated us all with the most careful and considerate kindness, not such as was dictated by a sense of official duty, but such as springs from brave men's hearts when stirred by great pity and compassion. In mentioning Captain Schley, Lieutenant Emory, and Chief Engineer Melville in this respect, I must add that none were second in good offices to those named.

The watchful skill and unwearying personal attentions of Surgeons Green and Ames insured the building up of the faint spark of vitality which remained in us. Less judicious supervision and firmness might easily have proved fatal. The generous, impulsive seamen gave indiscriminately; and Long, I am told, was found loaded down with concealed biscuit which he had begged. Lieutenant Colwell's wise discretion in feeding us at first should be particularly noticed. Deaf alike to my entreaties, orders, and abuse, he doled out slowly a few ounces of food while the surgeons were coming. The judg-



ESKIMO PASTOR AT THE GRAVE OF CHRISTIANSEN, GODHAVN.

(From a Relief Squadron photograph.)

ment, coolness, and discretion shown by him in a subordinate capacity the year before in disaster remained with him now in this hour of success.

Sergeant Elison died at Godhavn, July 8th, consequent on secondary amputation, which was absolutely necessary and equally hopeless. Though both hands and both feet had been lost by natural amputation, his indomitable will-power and naturally fine physique kept him alive for seven and a half months. Utterly helpless, fed with double our ration, cared for and nursed by his starving comrades, no open word or secret insinuation ever came to me that this drain on our strength and supplies was useless—this man a burden. I hardly know now whether most to admire the courage and will which kept Elison alive, or the devotion and charity of his comrades who gave so freely of their strength, food, and tender offices, knowing all the while that their sacrifices were in vain, except as a concession to their spirit of humanity and Christian charity.

Sergeant Elison was an honest, faithful man, who never spared himself when the interests of his comrades or of the expedition could be advanced. He was equally valuable in the workshop or field, as botanist, carpenter, or sledgeman.

This narrative properly ends with the rescue from the brink of the grave of the seven survivors of the Lady Franklin Bay Expedition. The story of the rescue has been modestly told by the chief actor, who dilates but little on the remarkable energy and great daring displayed by Lieutenant Emory and himself. No relief or expeditionary vessels ever ventured at so early a date the dangers of Melville Bay, and the zealous ardor of their commander encompassed the relief ships with the hazards and perils of that ice which is never entered except by the hardest and most fearless navigators of the present day—the Scotch whalers. I may be pardoned for differing from my friend and

rescuer, Captain Schley, in believing that the remnant of the expedition, saved from a horrible death through his zeal, energy, and daring, owes much to the indirect influence of these bold navigators. Not only did the Scotch whalers set forth on their voyage many days earlier than was customary, but with their usual skill and energy improved every opportunity, and by their numbers searched out the only available passages. Captain Schley, himself an apt pupil, profited by their experience and advice, and throughout the passage of Melville Bay there was a kindly feeling of generous rivalry in the search. Had the whalers delayed their voyage, or had they looked unkindly on the work, the relief squadron must have missed some of their opportunities; and, despite their great zeal and daring, reached Sabine days later, which meant the extermination of the party.

The wise act of Congress in offering a bounty to the whalers was the turning-point in our fortunes, and exemplifies the importance of utilizing all resources when the honor or credit of the nation is at stake. That the United States Navy won in the race for Sabine is an illustration of the wonderful adaptability and abundant resources of the representative American seaman, which so well fits him for coping successfully with new and untried dangers and makes him a worthy rival of "our kin across the sea."

As to other matters which have engaged an undue share of public attention, while having no official knowledge of the facts in the case, yet the responsibility for all action in connection with such an expedition rightfully and properly rests on the commanding officer. In assuming that responsibility I know of no law, human or divine, which was broken at Sabine, and do not feel called on as an officer or as a man to dwell longer on such a painful topic.

I should be unjust to the dead (and equally so to the living)

if I did not call attention to their arduous labors, heroic endurance, and unflinching determination, which advanced the national ensign into an unparalleled latitude both on sea and land, carried out the programme of international scientific observations, increased, perhaps in an unequalled degree in this century, our knowledge of the physical characteristics and configurations of polar lands; and which, more than all, in one of the most remarkable and successful boat journeys of the age, brought safely their records, at the price of great bodily suffering and with diminished chances of life, through a dense polar pack to a point whence they would eventually reach the world. They died for that end, and should not be forgotten.

The history of our reception, participated in by eminent men of the nation, is also known. From the President came later grateful words of thanks in behalf of himself and the Nation; Her Majesty the Queen of Great Britain, with her woman's gracious heart, was not content with sending the staunch *Alert* to our relief, but sent, too, on our return, kindly words of inquiry and sympathy; the eloquent message of the Honorable the Secretary of the Navy, whose zeal and interest insured the prompt and thorough outfitting of the relief expedition, and kindly greetings of other prominent men, will ever be held in remembrance by the survivors. These and other recognitions which have come to me as the chief may be considered a sufficient recognition of my share in the extraordinary successes and sufferings of the expedition.

It is inevitable in most great undertakings that the subordinates should be relegated to secondary places, but I cannot believe that our great nation, which spent money so lavishly to save these men, will allow their heroic endurance and manly virtues to pass unrewarded. Lieutenant Lockwood and the Eskimo Christiansen have unhappily passed away, but Sergeant

Brainard, who strove with them successfully to gain for the country the honors of the Farthest North, yet remains, after eight years of stainless and extraordinary service in the ranks, a sergeant. His manhood, courage, and self-sacrifice, displayed on the polar sea and at Sabine, would have gained him a commission at once in any other service of the world.

No man of the party has received promotion, except such temporary advancement as my personal urging could secure. Two men, with broken health, have adventured their private fortunes; and one, a most self-sacrificing, soldierly, temperate, and loyal man, lies, as these lines are penned, helpless in a city hospital, aided by private charity, his pension not even awarded.

Even the meagre allowances originally promised for Arctic service have not been fully paid, and the widows of the dead are generally as yet unrecognized.

Our great country in these days asks not in vain for its sons to venture their lives for any idea which may subserve its interests or enhance its greatness. I trust that posterity may never mourn the decadence of that indomitable American spirit which in this generation fought out to the bitter end its great civil war, and made it seem an easy thing in time of peace to penetrate the heart of Africa, to perish in the Lena Delta, to die at Sabine, or to attain the Farthest North.

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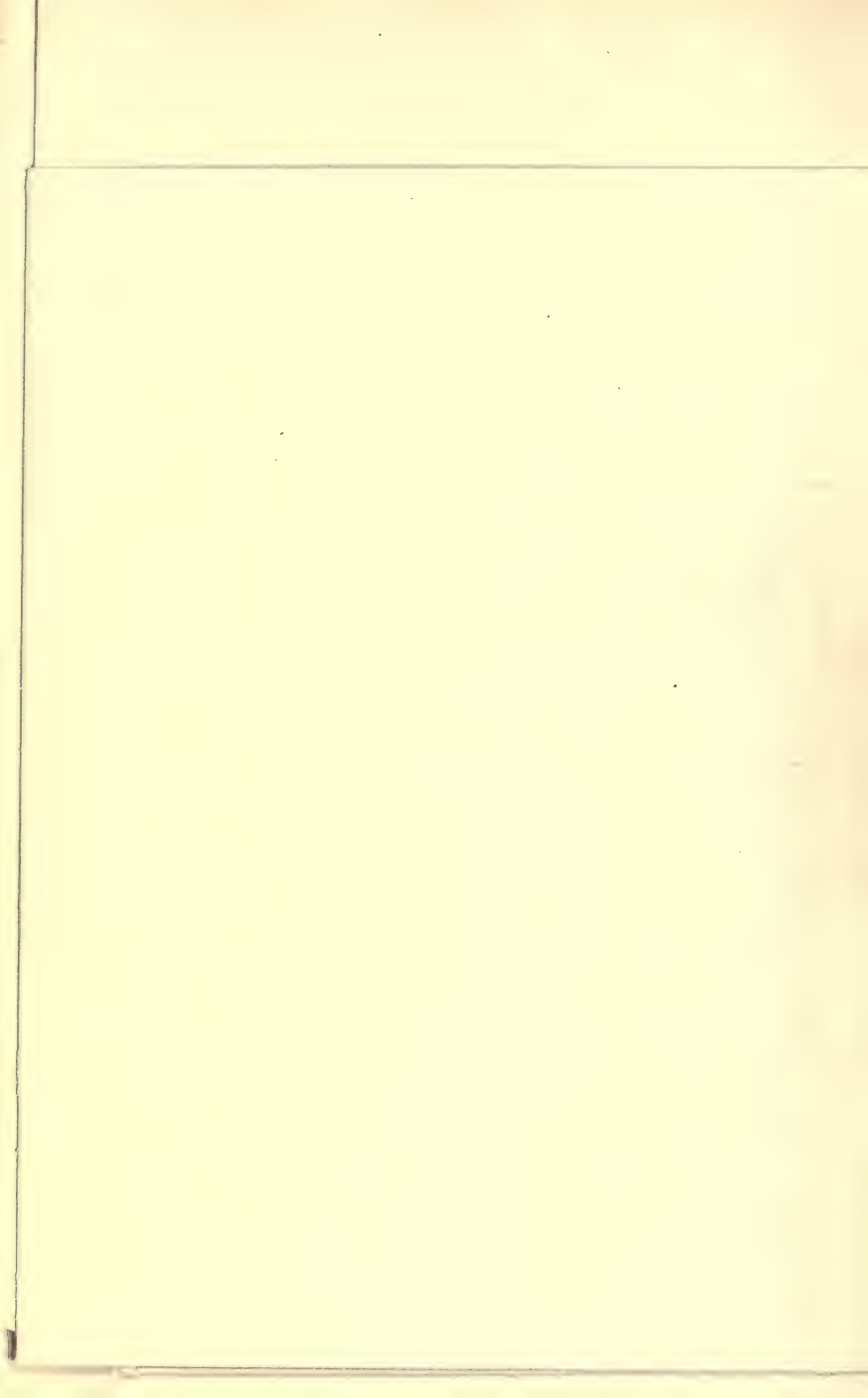
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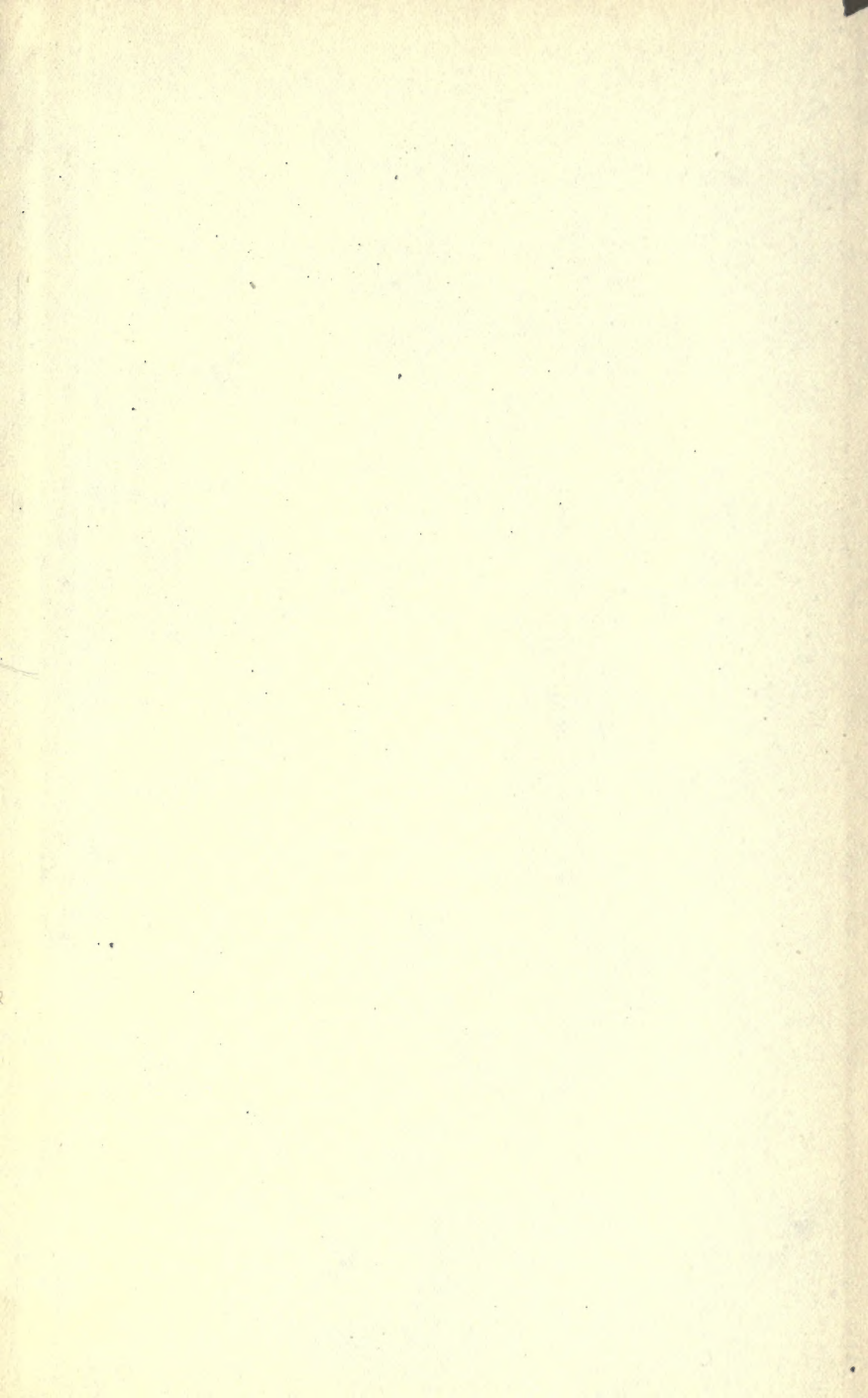
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